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Committee on the Peaceful Uses of Outer Space

Coordination of outer space activities within the United Nations system: programme of work for 2002 and 2003 and future years

Report of the Secretary-General*

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Abbreviations

AGRHYMET	Regional Training Centre for Agrometeorology and Operational Hydrology and their Applications
AOC-HYCOS	West and Central African Hydrological Cycle Observing System
AVHRR	advanced very high resolution radiometer
BDT	Telecommunication Development Bureau (of ITU)
CEOS	Committee on Earth Observation Satellites
COSPAS-SARSAT	International Satellite System for Search and Rescue
DCP	data collection platform
EAP.AP-Bangkok	Environment Assessment Programme for Asia and the Pacific (of UNEP)
ECA	Economic Commission for Africa
ECE	Economic Commission for Europe
ECLAC	Economic Commission for Latin America and the Caribbean
EDC	EROS Data Center
ENRIN	Environment and Natural Resources Information Networking (UNEP)
EPA	Environmental Protection Agency (of the United States of America)
EROS	Earth Resources Observation System
ESA	European Space Agency
ESCAP	Economic and Social Commission for Asia and the Pacific
ESCWA	Economic and Social Commission for Western Asia
ESRI	Environmental Systems Research Institute
EURISY	European Association for the International Space Year
EUTELSAT	European Telecommunications Satellite Organization
FAO	Food and Agriculture Organization of the United Nations
GAW	Global Atmosphere Watch (of WMO)
GCOS	Global Climate Observing System (of ICSU/IOC/UNEP/WMO)
GEF	Global Environment Facility
GEO	Global Environment Outlook (of UNEP)
GIS	geographic information system
GIST	Geographic Information Support Team
GLONASS	Global Navigation Satellite System (of the Russian Federation)
GNSS	global navigation satellite systems

GOES	Geostationary Operational Environmental Satellite
GOS	Global Observing System (of WMO)
GPS	Global Positioning System (of the United States of America)
GRID	Global Resource Information Database (of UNEP)
GTOS	Global Terrestrial Observing System (of FAO/ICSU/UNEP/ UNESCO/WMO)
HYCOS	Hydrological Cycle Observing System (of WMO)
IAEA	International Atomic Energy Agency
ICAO	International Civil Aviation Organization
ICIMOD	International Centre for Integrated Mountain Development
ICSU	International Council for Science
ICT	information and communication technologies
IGFA	International Group of Funding Agencies for Global Change Research
IGOS	Integrated Global Observing Strategy
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
ISDR	International Strategy for Disaster Reduction
ISU	International Space University
ITC	International Institute for Aeorospace Survey and Earth Sciences
ITU	International Telecommunication Union
ITU-BR	ITU Radiocommunication Bureau
ITU-R	ITU Radiocommunication Sector
Landsat	Land Remote Sensing Satellite
MED-HYCOS	Mediterranean Hydrological Cycle Observing System
MIRCEN	microbial resources centres (of UNESCO)
NASA	National Aeronautics and Space Administration (of the United States of America)
NOAA	National Oceanic and Atmospheric Administration (of the United States of America)
RESAP	Regional Space Applications Programme for Sustainable Development
ROPME	Regional Organization for the Protection of the Marine Environment
SADC	Southern African Development Community
SADC-HYCOS	Southern African Development Community Hydrological Cycle Observing System
SCOPE	Scientific Committee on Problems of the Environment (of ICSU)

UNDCP	United Nations International Drug Control Programme
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNHCR	Office of the United Nations High Commissioner for Refugees
UNIDO	United Nations Industrial Development Organization
UNICEF	United Nations Children's Fund
UNISPACE III	Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space
UNITAR	United Nations Institute for Training and Research
UNOPS	United Nations Office for Project Services
USAID	United States Agency for International Development
USFS	United States Forestry Service
USGS	United States Geological Survey
WCRP	World Climate Research Programme (of ICSU/IOC/WMO)
WFP	World Food Programme
WHO	World Heath Organization
WHYCOS	World Hydrological Cycle Observing System (of WMO)
WIPO	World Intellectual Property Organization
WMO	World Meteorological Organization

I. Introduction

1. Since the beginning of the space age in 1957, space exploration and exploitation have yielded tremendous scientific as well as economic and societal benefits for humanity. Space science and technology and their applications are recognized by many as one of the major tools to understand the Earth's environment, to improve management of natural resources, to better prepare ourselves for natural disasters and to provide effective communications across long distances and to rural areas.

2. Earth observation satellites provide an important and unique source of data for the study of the Earth's system. Information from such satellites is being used to address issues of social and economic importance in such areas as food security, land management, disaster reduction and emergency management, agricultural and fisheries management, forest resource assessment, global health, environment monitoring and development planning. Emerging new services using satellite communications provide more efficient solutions for improving education and training opportunities, ensuring access to adequate medical services, increasing the effectiveness of disaster warning and relief operations and developing adaptation or mitigation strategies in relation to climate change. Meteorological and Earth observation satellites provide the data for weather forecasts, contributing to better planning of agricultural strategies and various daily activities, while the warnings they provide on hurricanes and cyclones have dramatically reduced material and human losses in many countries that are prone to such disasters. Satellite positioning systems, such as the Global Positioning System (GPS) of the United States of America and the Global Navigation Satellite System (GLONASS) of the Russian Federation, originally deployed for strategic military purposes, now provide non-encrypted signals, free of charge, for civilian applications such as air, land and nautical navigation, enhancing the safety of air, land and sea travel.

3. Space applications already contribute to the protection of the Earth's environment by providing and disseminating critical information on the state of the Earth. If used effectively, space science and technology could contribute significantly to accelerating development in many different ways without compromising the needs of future generations. They could provide better alternatives for survival to those who are caught in the downward spiral of environmental degradation and increasing poverty, forced to exploit limited natural resources for survival and impoverished further by the depletion of resources.

4. Space applications also contribute to early warning, disaster preparedness, disaster mitigation, disaster impact assessment, risk assessment, vulnerability reduction, disaster relief and disaster rehabilitation, minimizing the loss of human life and damage to property caused by natural disasters and facilitating reconstruction of the economic and social foundation after disasters. Natural disasters can destroy in minutes all the progress made in social and economic development over years by developing countries. Space applications offer a cost-effective tool to secure sustainable economic and social development. The profile of space applications for disaster reduction and emergency management has increased in the last few years and should be strengthened in the future.

5. Many organizations of the United Nations system promote sustainable development through their activities, in particular in developing countries. Space applications can support their efforts in various ways. Some organizations of the United Nations system have already incorporated the routine operational use of space tools in their development activities and have been active in promoting international cooperation in the application of space science and technology within their specific domain of responsibility.

6. Recognizing the increasing need to coordinate the space activities of the various organizations of the United Nations system, the Administrative Committee on Coordination (now the United Nations System Chief Executives Board for Coordination) in 1975 established a subcommittee on outer space activities to ensure cooperation among interested organizations in future programmes and projects in the fields of communications, meteorology, remote sensing and geographic information systems (GIS). The Inter-Agency Meeting on Outer Space Activities meets annually and provides a forum for the participating organizations of the United Nations system to exchange information and views on the current and future plans of space-related activities of common interest and to promote collaboration and synergy among the entities of the United Nations system. The Office for Outer Space Affairs of the United Nations Secretariat serves as the secretariat of the Meeting.

7. In 1975, the Committee on the Peaceful Uses of Outer Space also recognized the growing need for coordination in view of the increasing volume of outer space activities and greater involvement of the organizations of the United Nations system and recommended that an integrated account of the plans and programmes of the organizations be prepared to ensure the effectiveness of the various programmes. The Secretary-General was asked to produce such a report, on an annual basis, for consideration by the Committee's Scientific and Technical Subcommittee. Since the first report of the Secretary-General on the coordination of outer space activities within the United Nations was submitted to the Subcommittee in 1976 (A/AC.105/166 and Corr.1), 25 reports have been issued to date. The report, including the calendar of significant events (annex I) and the list of significant outputs (annex II), is compiled by the Office for Outer Space Affairs based on submissions from organizations in the United Nations system. The Inter-Agency Meeting, at its annual session, reviews and finalizes the report. In recent years, some 10 to 12 organizations have been attending the annual session of the Inter-Agency Meeting and contributing to the report.

II. Participants in outer space activities of the United Nations system and matrix of outer space programmes

8. The participants in outer space activities within the United Nations system include the following Secretariat units, bodies, research institutes, specialized agencies and other entities: Office for Outer Space Affairs, Department of Peacekeeping Operations, Office for the Coordination of Humanitarian Affairs, Department of Economic and Social Affairs, United Nations Office for Project Services (UNOPS), secretariat for the International Strategy for Disaster Reduction (ISDR), Economic Commission for Africa (ECA), Economic Commission for Europe (ECE), Economic Commission for Latin America and the Caribbean (ECLAC), Economic and Social Commission for Asia and the Pacific (ESCAP), Economic and Social Commission for Western Asia (ESCWA), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), Office of the United Nations High Commissioner for Refugees (UNHCR), United Nations Children's Fund (UNICEF), World Food Programme (WFP), United Nations International Drug Control Programme (UNDCP), United Nations Institute for Training and Research (UNITAR), Food and Agriculture Organization of the United Nations (FAO), United Nations Educational, Scientific and Cultural Organization (UNESCO), International Civil Aviation Organization (ICAO), World Health Organization (WHO), World Bank, International Telecommunication Union (ITU), World Meteorological Organization (WMO), International Maritime Organization (IMO), World Intellectual Property Organization (WIPO), United Nations Industrial Development Organization (UNIDO) and International Atomic Energy Agency (IAEA).

III. Policies and strategies pertaining to coordination of space-related activities

9. In its resolution 54/68 of 6 December 1999, the General Assembly endorsed the resolution of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) entitled "The Space Millennium: Vienna Declaration on Space and Human Development".[1] In its resolution 56/51 of 10 December 2001, the Assembly urged organizations of the United Nations system to take the necessary action for the effective implementation of the Vienna Declaration.

10. At its forty-fourth session, based on the results of the survey conducted by the Office for Outer Space Affairs among Member States, the Committee on the Peaceful Uses of Outer Space identified the recommendations from UNISPACE III that had been accorded highest priority by Member States and those for which some member States had offered to lead the activities. The Committee established 11 action teams under the leadership of member States to start their work in 2001 towards the implementation of those recommendations relating to environmental monitoring, management of natural resources, weather and climate forecasting, public health services, disaster management, global navigation satellite systems,

Table
Participants in outer space activities and matrix of outer space programmes[a, b]

United Nations entity	*Development of law, standards and ethics*	*Protecting the Earth's environment*	*Human security, development and welfare*	*Information and communication technology*	*Satellite position and location capabilities*	*Building capacity*	*Advancing scientific knowledge*	*Other activities*
Office for Outer Space Affairs	25-29, 31	33, 60, 61	125-128, 131-133, 155, 171	191-193	234	241-245	268, 269	275
Department of Peacekeeping Operations			142-145, 147, 148					
Office for the Coordination of Humanitarian Affairs			129, 130, 139, 142-148					
Department of Economic and Social Affairs		60, 61		189, 190				
Secretariat for ISDR			125, 131-133					
ECA			172-174	194-198		246, 247		
ECE		107, 124				248		274
ECLAC		45						
ESCAP		33, 62, 63, 108, 109	134-136, 175	199-202		249-251, 262		270-273
ESCWA				203		252		
UNDP		46, 86, 99	138, 140, 178	232		262, 267		274
UNEP		33, 34, 36, 39, 42-44, 64-94, 96, 105, 110-113, 115	125, 137-140, 176, 177	204-206		253-263		274
UNHCR		95, 114	141-145, 147-155	232				274
UNICEF			142-148, 150					
WFP			142-148					
UNDCP			171					
UNITAR		103, 104						274
FAO		33-35, 39, 42-44, 87, 96, 108, 114-116, 124	125, 142-148					
UNESCO	25, 30, 31	33, 34, 36, 39-44, 47-49, 55-58, 92, 96-101, 115-124	125, 157-163, 170, 178-187	227-233		264, 265		275-277
ICAO			167		235-240			
WHO			142-148					274
World Bank		46, 86, 114	142-148	195				274
ITU	25	102-105	156, 182	207-226, 230-232	236			
WMO		33, 34, 36-39, 41-44, 46-55, 59, 96, 106	125, 164-170, 188			266, 267		
IMO			170		237			
WIPO	25, 32							
IAEA	28							

[a] The numbers in each column indicate the relevant paragraphs in the present report.
[b] For continuously updated information on the coordination of outer space activities within the United Nations system, see http://www.uncosa.unvienna.org

promotion of sustainable development, near-Earth objects, capacity-building, public awareness of space benefits and innovative sources of funding. The Committee encouraged the active participation of the organizations of the United Nations system in the action teams in order to ensure that the activities of those organizations contributed to the work of the action teams. As requested by the Committee, the Office conducted a survey among the organizations of the United Nations system in order to identify the recommendations for which they wished to become members of the action teams. As at 15 January 2002, 10 such organizations had indicated their interest in joining the action teams.

11. At their sessions in 2001, the Committee and its Scientific and Technical Subcommittee noted with satisfaction that the Inter-Agency Meeting had held its twenty-first session at the United Nations Office at Vienna from 22 to 24 January 2001 and that the report on its deliberations (A/AC.105/756) and the report of the Secretary-General on coordination of outer space activities within the United Nations system: programme of work for 2001 and 2002 and future years (A/AC.105/757) were before the Committee and the Subcommittee. The Committee noted that the next session of the Inter-Agency Meeting on Outer Space Activities was scheduled to be held in Rome from 23 to 25 January 2002 and that it would be hosted by FAO.

12. At its thirty-eighth session, in 2001, the Scientific and Technical Subcommittee began to consider a new agenda item, entitled "Means and mechanisms for strengthening inter-agency cooperation and increasing the use of space applications and services within and among entities of the United Nations system" under a three-year work plan, covering the period from 2001 to 2003. In accordance with the work plan, the Subcommittee, at its thirty-eighth session, in 2001, analysed the current levels of usage of space applications and services within the United Nations system on the basis of information provided by organizations of the system. The Subcommittee noted from the information provided that several organizations were unaware of how space-based services might help them to meet their objectives. The Subcommittee was of the view that it was necessary to approach organizations of the system more actively to raise their awareness of the potential advantages of those services. For its work to be conducted during the second year of the work plan, 2002, the Subcommittee invited the Inter-Agency Meeting to consider the barriers to the use of space technology and how the Subcommittee could support the work of the Meeting and the space-related activities of organizations of the United Nations system.

13. Following the agreement of the Committee on the Peaceful Uses of Outer Space, the Chairman of the Committee addressed a letter to the Secretary-General in order to bring to his attention the need to consider the contributions of space science and technology to a greater extent in achieving the objectives of major United Nations conferences, taking particular account of the needs of developing countries. In its resolution 56/51, the General Assembly invited all the organizations of the United Nations system, in particular those which participate in the Inter-Agency Meeting, to identify recommendations of major United Nations conferences that could be implemented with the use of space science and technology.

14. One emerging aspect is the potential beneficial impact that satellite techniques can have on local communities in the domain of disaster reduction and emergency management. The increased impact of natural disasters and the growing vulnerability of societies to all forms of hazard have resulted in the need to develop risk management measures and to apply them to vulnerable communities worldwide, especially through regional programmes. The inter-agency agreement for cooperation concluded in 2000 by the secretariat for ISDR and the Office for Outer Space Affairs serves as a basis for the expansion of initiatives and services in that specific area. In particular, the ISDR programme provides an ideal framework within which the Office for Outer Space Affairs and its partners can pursue more effective initiatives aimed at enlarging the user base for satellite applications for disaster management and prevention, such as those of the United Nations Programme on Space Applications.

15. In March 2000, the United Nations Geographic Information Working Group was established under the auspices of the Consultative Committee on Programme and Operational Questions of the Administrative Committee on Coordination to coordinate activities and formulate policies concerning geographic information within the United Nations system. Its mandate is to increase the role of geographic

information in both vertical and horizontal United Nations structures through cooperation with external institutions such as non-governmental organizations, research and academic institutions and technology producers. The Working Group is chaired by the Chief of the Cartographic Section of the Library and Information Resources Division of the Department of Public Information of the Secretariat and consists of task managers and technical focal points from agencies throughout the system. The Office for the Coordination of Humanitarian Affairs, the Department of Peacekeeping Operations, ECE, UNEP, UNDCP, UNHCR and UNESCO, for example, will continue their cooperation within the framework of the Working Group, whose third meeting will be held in Washington, D.C., in March 2002. The meeting will review progress made since the meeting in Rome in 2001. Particular focus will be on progress made by different working groups for the creation of a United Nations geographic database: metadatabase/clearing house; international boundaries and coastlines; administrative boundaries; remote sensing; field operations; cartographic guidelines; and training.

16. In the area of geographic information, ECA will concentrate on raising awareness of the importance of national and regional geographic information infrastructures to encourage African Governments and societies to embark on the coordination of the resources for the production, maintenance, management, dissemination and utilization of geospatial data to make relevant geographic information available to Governments for effective decision-making and to the public to participate in the process. They will also be encouraged to develop harmonized foundation or core data sets on which to base thematic data sets for the various development sectors, such as natural resources, environment, food security, land reform, transport and communication infrastructure, human settlements, health and education, energy and tourism.

17. Concomitant to that, equal attention will also be given to promoting the development of standard-based clearinghouse nodes and metadata systems to facilitate access to shared regional and global geographic information resources and to facilitate also the dissemination of geographic information and knowledge. In that context, assistance will be provided to ECA member States to develop appropriate national geo-information policies, standards and coordination arrangements and a standard-based portal will be implemented at ECA to provide a single point of entry to clearinghouse nodes and portals of member States and regional and global partners.

18. ESCAP will follow up the recommendations of the Second Ministerial Conference on Space Applications for Sustainable Development in Asia and the Pacific, held in November 1999, to strengthen further the regional cooperative network and enhance national capacities in space technology applications through the implementation of the second phase of the Regional Space Applications Programme for Sustainable Development (RESAP II). This is part of ESCAP efforts to strengthen the national capacity of members and associate members to achieve sustainable development, as well as regional and subregional cooperation on protection of the environment and development and management of natural resources, taking into account the recommendations of the Programme for the Further Implementation of Agenda 21, adopted by the General Assembly at its nineteenth special session, in June 1997, the outcome of the World Summit on Sustainable Development scheduled for 2002, which is the 10-year review of Agenda 21, the recommendations of UNISPACE III and the priorities given by members and associate members of ESCAP at intergovernmental legislative meetings.

19. At its fifty-seventh session, in April 2001, ESCAP emphasized that its three major development priorities were poverty alleviation; addressing the negative impacts of globalization; and emerging social issues. The implementation of RESAP II will serve those development priorities and promote operational and integrated applications of information and communication technology and space technology to address issues of common concern among countries of the region, with a focus on poverty alleviation, natural disaster reduction, environment and natural resource management and sustainable development planning. Building on the framework of cooperation of RESAP, ESCAP will continue to promote regional cooperation and facilitate among its members and associate members the equitable sharing of the benefits of space technology applications with the aim of achieving sustainable development and improving the quality of life. ESCAP will also pursue its efforts to harmonize regional initiatives in space cooperation in the region.

20. ESCWA envisages that the recently established ESCWA Committee on Science, Technology and Innovation will facilitate cooperation among ESCWA member States in many fields of science and technology, including areas concerning applications of outer space technologies.

A. Enhancing partnerships with non-governmental entities

21. Recognizing the contributions of non-governmental entities to the success of UNISPACE III, the Committee on the Peaceful Uses of Outer Space encourages the participation of non-governmental entities in its work. The Committee agreed that the action teams established to implement the recommendations of UNISPACE III should actively consider non-governmental entities that could be invited to participate in the teams.

22. Pursuant to a recommendation of UNISPACE III, the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space has been holding a symposium at its annual session to strengthen its partnership with industry since its thirty-seventh session, in 2000. The purpose of the industry symposium, as recommended by UNISPACE III, is to provide the Subcommittee with updated information on ongoing activities of space-related industries and to offer opportunities to managers from space-related industries to express concerns and to make suggestions aimed at promoting, in particular, the interests of developing countries. At the thirty-ninth session, in 2002, the symposium will focus on the promising area of very high resolution remote sensing and its impact on operational applications and will discuss the new situation as regards the space market.

23. More non-governmental entities are contributing to the work of the Committee on the Peaceful Uses of Outer Space as observers. At its forty-fourth session, the Committee decided to grant permanent observer status to the National Space Society, the European Association for the International Space Year (EURISY) and the Space Generation Advisory Council. In its resolution 56/51, the General Assembly endorsed the decision of the Committee, increasing the number of the international organizations with permanent observer status with the Committee from 12 to 15.

24. The Office for Outer Space Affairs forged a partnership with Space Media, Inc. to launch the UN-STARS Programme, which is a commercial education initiative of Space Media, Inc., that creates opportunities for students to design and fly scientific experiments aboard the Space Shuttle and, in the near future, aboard the International Space Station. Student researchers monitor the experiment through the Internet, while thousands of other students can watch online while conducting control experiments of their own. Through the Programme, the Office aims to provide such opportunities for students around the world, in particular in developing countries.

B. Development of law, standards and ethics relating to space activities

25. The Office for Outer Space Affairs is the secretariat of the Committee on the Peaceful Uses of Outer Space, which is the primary forum for the development of international space law. The Committee's Legal Subcommittee continues to consider legal issues of importance to the international space community, including the status and implementation of the five treaties and five sets of legal principles on outer space that have been developed under United Nations auspices. Organizations such as ITU, UNESCO and WIPO participate in the work of the Legal Subcommittee as observers, for instance through the Subcommittee's regular agenda item on "Information on the activities of international organizations relating to space law".

26. In November 2001, the text of a multilateral Convention on International Interests in Mobile Equipment was finalized under the auspices of the International Institute for the Unification of Private Law (Unidroit). The essential purpose of the Convention is to provide for the constitution and effects of new international interests in (high-value) mobile equipment, embracing classic security interests and their functional equivalents, through the recording of such interests in newly-established international registers. The Convention contain the basic principles of general application, but is intended to be supplemented by individual protocols for each of the different categories of equipment (aircraft, space objects, international railway rolling stock, etc.) encompassed by its sphere of application. The Committee on the Peaceful

Uses of Outer Space and the Office for Outer Space Affairs are working closely with counterparts in Unidroit on the development of the draft space equipment protocol and the subject was formally considered by the Committee's Legal Subcommittee at its fortieth session, in 2001. In addition, pursuant to an agreement of the Committee, two sets of intersessional working meetings amongst member States were organized under the auspices of the Subcommittee in September 2001 and January 2002. It is anticipated that the regimen established by the Convention and the protocol on space equipment may significantly improve conditions for secured transactions and asset-based financing within the field of commercial space activity, thereby reducing project costs on a global scale and enabling increased access to space projects financing, for instance for entities from developing countries.

27. In 2002, the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space will start a new work plan on space debris. That work plan may result in the Subcommittee's adoption of voluntary measures that could be taken by national authorities to reduce the creation of space debris. Proposed debris mitigation measures are being developed by the Inter-Agency Space Debris Coordination Committee, a body composed of representatives from various national space agencies, and may be presented to the Subcommittee as early as 2003.

28. The Scientific and Technical Subcommittee is also reviewing the item "Use of nuclear power sources in outer space" within the context of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space (see General Assembly resolution 47/68), a set of non-binding legal principles adopted by the Assembly in 1992. IAEA is participating in the review.

29. The Office for Outer Space Affairs will continue to maintain, on behalf of the Secretary-General, the United Nations Public Register of information furnished in accordance with article IV of the Convention on Registration of Objects Launched into Outer Space (General Assembly resolution 3235 (XXIX), annex) and to disseminate such information to Member States. Information in the Register can be accessed and searched easily online at http://www.oosa.unvienna.org/OSOIndex/index.html

30. The World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) of UNESCO, through its Subcommission on the Ethics of Outer Space, has prepared recommendations based on ethical principles and guidelines, aimed at facilitating the emergence of an ethics of space. Those recommendations, which are intended to ensure constant respect for human rights and freedoms in the development of the use of outer space and related technologies, will be presented to UNESCO member States during the biennium 2002-2003.

31. Given their common fields of action in the ethics of outer space, COMEST has established cooperative relations with the Office for Outer Space Affairs and the United Nations Committee on the Peaceful Uses of Outer Space. To that end, the Committee invited COMEST to join forces with a group of experts appointed by States members of the Committee in order to prepare a joint report presenting an analysis of the ethical principles that should be applied to human activities in outer space, within the framework of the United Nations treaties on outer space. The report is due to be submitted to the Committee in 2003.

32. WIPO recognizes that significant changes and developments in space activities give rise to new issues, in particular in the area of intellectual property. In 2001, WIPO announced its intention to launch worldwide consultations among Governments and users of the patent system under a new initiative, the WIPO Patent Agenda, in order to develop a strategic blueprint for the future evolution of the international patent system. The WIPO Patent Agenda will complement and strengthen ongoing patent-related projects such as the draft substantive patent law treaty and the reform of the Patent Cooperation Treaty. Although those activities cover the protection of inventions in general, they are also relevant to the protection of intellectual creations relating to outer space activities. Further, the WIPO programme and budget for the biennium 2002-2003 include the consideration of the measures to take and the form to give to any conclusions member States of WIPO may draw on the protection of industrial property in outer space.

IV. Current space-related activities

A. Protecting the Earth's environment and managing natural resources

1. Advancement of Earth science

33. In 2001 and 2002, the Office for Outer Space Affairs, ESCAP, UNEP, FAO, the Intergovernmental Oceanographic Commission (IOC) of UNESCO and WMO will continue to contribute to the work of the Committee on Earth Observation Satellites (CEOS) as associate members as well as participating in the implementation of the Integrated Global Observing Strategy (IGOS). ESCAP will contribute to the activities of the new ad hoc Working Group on Education and Training for Developing Countries of CEOS.

34. FAO, the International Council for Science (ICSU), UNEP, UNESCO and WMO are founding members of the Global Terrestrial Observing System (GTOS). The central mission of GTOS is to provide policy makers, resource managers and researchers with decision support tools and access to the data needed to detect, quantify, locate, understand and warn of changes (especially reductions) in the capacity of terrestrial ecosystems to support sustainable development. GTOS focuses on five issues of global concern: changes in land quality; availability of freshwater resources; loss of biodiversity; pollution and toxicity; and climate change. The system aims to provide guidance in data analysis and to promote (a) integration of biophysical and socio-economic geo-referenced data; (b) interaction between monitoring networks, research programmes and policy makers; (c) data exchange and application; and (d) quality assurance and harmonization of measurement methods.

35. The FAO Environment and Natural Resources Service hosts the GTOS secretariat at its headquarters on behalf of the GTOS sponsors. The GTOS secretariat, under the guidance of the GTOS Steering Committee, is currently developing a global terrestrial observing network and a terrestrial ecosystem monitoring sites metadatabase, and is planning to hold joint regional workshops with the Global Climate Observing System (GCOS) to formulate regional activities. Closer cooperation is also envisaged with other parties in the framework of priorities identified by the IGOS partners, including in particular a theme on terrestrial carbon monitoring, initially involving the estimation of global net primary productivity, evolving into an international global carbon observations theme, which would initially include global mapping and monitoring of carbon sources and sinks. Following formal endorsement of the IGOS theme of terrestrial carbon observation at the thirteenth plenary meeting of CEOS, held in Stockholm in November 1999, planning meetings for future activities were held in Ottawa and Lisbon in February and May 2000, respectively. GTOS is also actively developing subregional data and information networks in eastern Europe and southern Africa. Further details on GTOS activities can be found at http://www.fao.org/gtos

36. ICSU, UNEP, IOC and WMO continue to support the implementation of a global system for observing climate through their sponsorship of GCOS. GCOS is a longer-term, user-driven operational system capable of providing the comprehensive observations required for monitoring the climate system, for detecting and attributing climate change, for assessing the impact of climate variability and change and for supporting research aimed at improving the understanding, modelling and prediction of the climate system. It addresses the total climate system, including physical, chemical and biological properties and atmospheric, oceanic, hydrologic, cryospheric and terrestrial processes.

37. The GCOS Initial Operational System (IOS) is being implemented under the direction of the GCOS Steering Committee and supported by the GCOS secretariat, which is located at WMO in Geneva. IOS is made up of the relevant components of existing or planned observational networks such as the WMO Global Observing System (GOS) and Global Atmosphere Watch (GAW) and the climate components of the Global Ocean Observing System (GOOS) and GTOS as well as the enhancements and new systems needed to meet the requirements for climate observations. Space-based observations form an integral and crucial part of IOS for such observations. GCOS science panels have defined the detailed requirements and GCOS works in close cooperation with CEOS in attempting to ensure that the necessary observations from space will be obtained. Revised and updated space observations and in situ observation plans, including recommendations and a list of user

requirements can be found on the GCOS web site, http://www.wmo.ch/web/gcos/gcoshome.html

38. The GCOS secretariat, on behalf of its observing system partners, has provided input on systematic observations to the United Nations Framework Convention on Climate Change through its Subsidiary Body on Scientific and Technological Advice. The Conference of Parties to the Framework Convention has adopted several decisions supporting the development of global observing systems for climate that are based on the integration of space-based and in situ observations. Those decisions are resulting in the development of national plans for systematic observation and the organization of regional workshops and regional action plans to improve climate observations in developing countries.

39. ICSU, UNEP, IOC and WMO continue to cooperate closely in the development, planning and implementation of GOOS. IOC will continue to contribute to the work of CEOS in the development of user requirements for sensors and data management systems within the framework of the GOOS programme. As a member of the IGOS Partnership, IOC, along with UNEP, WMO, FAO, ICSU, the International Geosphere-Biosphere Programme (IGBP), the World Climate Research Programme (WCRP), CEOS and the International Group of Funding Agencies for Global Change Research (IGFA) developed during 2000 a thematic approach to IGOS in which the first element to be developed was the oceans theme. The oceans theme document was approved by CEOS in November 2000 and published in January 2001. In addition, GOOS is working with the ocean carbon community to develop an ocean carbon component of the integrated global carbon observations theme, and with UNEP and others to develop a coastal theme, the first subtheme of which will be devoted to coral reefs.

40. IOC, through the newly formed Coastal Ocean Observations Panel, stresses the importance of ocean colour data, in particular the optimization of quality of data for validation especially of coastal waters. The panel continues to advocate the collection of essential ocean and atmospheric data, data merging and access to data.

41. The WMO/IOC Joint Technical Commission for Oceanography and Marine Meteorology maintains a high level of interest in the use of satellites for ocean remote sensing and the provision of marine services based on satellite data. A rapporteur reports to the Commission and WMO members on issues relating to requirements for, access to and applications of remotely sensed ocean data. The rapporteur also liaises with the WMO Commission for Basic Systems and prepares regular reports for the Commission.

42. UNEP, FAO, IOC, WMO, UNESCO and ICSU have in the past cooperated frequently in the development of global environmental monitoring systems and more particularly in recent years in those systems designed to tackle climate-related issues. The emergence of IGOS is providing a suitable framework to facilitate the on-forwarding of appropriate advice and recommendations to the governing bodies of these organizations sponsoring environmental observing systems through their relevant steering committees, secretariats and expert panels.

43. UNEP, FAO, IOC, WMO, UNESCO and ICSU will continue to cooperate in the Sponsors Group for the Global Observing Systems.

44. A number of partners, including CEOS, FAO, UNESCO, ICSU, IOC, UNEP, WMO and IGFA have been working together closely since 1998 on the development of an IGOS in an effort to optimize space-based and in situ observing networks and application programmes at the global, regional and national levels. IGOS was presented at UNISPACE III at a one-day high-level forum coordinated by FAO. Conclusions and proposals of the International Forum on the Integrated Global Observing Strategy are contained in the report of UNISPACE III. IGOS has developed a theme approach towards an integrated strategy and has endorsed themes on oceans, integrated global carbon observations, integrated global atmosphere chemistry observations and integrated global water cycle observations and a coral reef subtheme as the first component of an expected coastal theme. A geological-geophysical hazards theme is being prepared by UNESCO, ICSU and the European Space Agency (ESA).

45. The potential of support from space applications and services is always considered in the various ECLAC technical assistance missions and policy documents on subjects such as climate change issues.

46. The application of satellite technology in meteorology, climatology and operational hydrology forms an important element of the technical

cooperation activities of WMO. Those activities are generally undertaken with assistance from either the Organization's Voluntary Cooperation Programme or other sources of funding such as UNDP, trust funds, the World Bank and the European Commission. The following activities are planned for 2001 and future years:

(a) *Africa*

(i) A number of WMO members, including France, Germany, Italy, the United Kingdom of Great Britain and Northern Ireland and the United States of America, are donating data collection platforms (DCPs) to countries in Africa for the collection of meteorological data via the geostationary meteorological satellite Meteosat, to improve the availability of observational data at national meteorological centres;

(ii) Eight Intelsat satellite stations were installed in the countries that are members of the Permanent Inter-State Committee on Drought Control in the Sahel, with funding from the United States Agency for International Development (USAID), in order to enhance the flow of data and products between the Regional Training Centre for Agrometeorology and Operational Hydrology and their Applications (AGRHYMET) in Niamey and national AGRHYMET centres;

(iii) In collaboration with the World Bank, WMO has drawn up plans to set up in Africa an advanced hydrological and environmental monitoring system using Meteosat. More than 100 DCPs will be installed on major rivers, costing between $10 million and $20 million over a period of five years;

(iv) The European Union has approved a project to provide support for the replacement of ground receiving satellite equipment in 47 African countries in order to enable them to receive data and products from the Meteosat second-generation satellites;

(v) Within the framework of the Mediterranean Hydrological Cycle Observing System (MED-HYCOS), a project funded by the World Bank for the establishment of a hydrological information system for the Mediterranean basin, based, inter alia, on the collection of near real-time data, a network of 36 Meteosat DCPs has been installed in 13 countries of the Mediterranean rim. The planned second phase of MED-HYCOS also makes provision for the purchase and installation of about 40 Meteosat DCPs to strengthen the existing real-time observing network;

(vi) Similarly, within the framework of the SADC-HYCOS project funded by the European Commission, 42 Meteosat DCPs have been established in 11 Southern African Development Community (SADC) countries, as a part of a network of 55 stations supplying near real-time data to a regional hydrological information system. Another 50 new DCPs are planned to be installed within the framework of the second phase of SADC-HYCOS currently being prepared;

(vii) With the support of France, the pilot phase of the Western and Central African Hydrological Cycle Observing System (AOC-HYCOS) project is being implemented, involving 11 countries of Western and Central Africa. AOC-HYCOS is maintaining a regional database collecting data from about 100 hydrological stations of the region, including about 70 Meteosat or Argos DCPs belonging to the networks of the Niger Basin Authority, the WHO African Programme for Onchocerciasis Control and the Upper Niger Basin Environmental and Hydrological Management (GHENIS) project, funded by the Netherlands;

(viii) The funding and implementation of the IGAD-HYCOS project for the countries of Eastern Africa is being discussed with the European Commission. Within the framework of that project provisions are sought for the installation of about 50 Meteosat DCPs in regionally significant hydrological stations of the region;

(b) *Americas*. The increasing demand in many developing countries of WMO regions III and IV (South and North America) and the limited availability of experts in the major satellite-operating countries prompted WMO to develop a new training strategy known as "training the trainers". That strategy takes an innovative approach to both training and applied research in satellite data utilization and shows how a regional meteorological training centre could develop

considerable expertise in the utilization of and training capability with digital geostationary operational environmental satellite imagery by participating in a "virtual laboratory" with the Cooperative Institute for Research in the Atmosphere and Cooperative Institute for Meteorological Satellite Studies, both of the United States National Oceanic and Atmospheric Administration (NOAA). In addition to the above, through the ongoing project of regional cooperation activities in support of the research on global change in the Inter-American Institute for Global Climate Change countries, WMO provides training related to satellite image analysis and processing, using GIS, GIS-SPRING and Met-View software, to 15 countries of WMO regions III and IV. CD-ROM Land Remote Sensing Satellite (Landsat) images have been bought for the project to enhance the capabilities of the participating countries to process and analyse such data, using modern techniques already provided for the project in previous training courses and seminars. The DCP ground equipment is being replaced with the support of the United States. WMO is providing technical support to the Mexican National Water Commission in the implementation of the water resources management project funded by the World Bank. Within the framework of the project new telemetric networks are to be installed in priority catchment areas. In particular 44 DCPs using the Geostationary Operational Environmental Satellite (GOES) have been installed in the Mexican part of the Rio Bravo (Grande) catchment area and another 60 are planned for 2002. To support the flood forecasting and warning component of the proposed CARIB-HYCOS project for the Caribbean islands, a few strategically located real-time DCPs are planned;

(c) *Europe and newly independent States.* Installation of small satellite Earth stations to provide meteorological services will be pursued and strengthened, in particular for newly independent States, for the reception of meteorological information distributed via European Telecommunications Satellite Organization (EUTELSAT) satellites, by RETIM of France and FAX-E(urope) of Germany within the framework of regional meteorological telecommunications. As already reported under (a) above, the MED-HYCOS project has installed a network of 36 Meteosat DCPs in countries of the region and about 40 other are foreseen in the planned second phase. The World Hydrological Cycle Observing System (WHYCOS) component for the Baltic Sea basin (Baltic-HYCOS) is being developed and provisions are made for equipping some 40 existing stations with DCPs, or in some cases for upgrading the telemetry equipment already in place;

(d) *Asia and the Pacific.* Satellite-based telecommunications systems are playing an increasing role in the distribution of meteorological data and products to national meteorological services. The international satellite communication systems operated by the National Weather Service of the United States have been extended to serve countries in the South Pacific. A satellite-based communications system is being operated to distribute meteorological information within Asia and is likely to be expanded to other countries in the area of coverage of the Asiasat satellite. Inmarsat-M Earth Stations are also being considered for improving communications of meteorological services in countries of the South Pacific.

47. The overall long-term goals of WCRP, jointly sponsored by WMO, ICSU and IOC, are to determine to what extent climate can be predicted and the extent of human influence on climate. Progress in the scientific programme depends on the successful continuation of existing and the development of new space-based Earth observing systems.

48. The successful implementation of the scientific plans for WCRP depends crucially, among other factors, in the development of a comprehensive and sustained global climate observational network, such as that envisaged in GCOS, in order to acquire the data needed to monitor climate, to detect climate change and establish its causes and to validate and improve climate models. In addition, special data are needed in support of an ever-widening variety of complex dynamic, physical, chemical and biological processes that help govern the state and evolution of the climate system. Such specialized data sets are likely to need to be highly resolved in time and space and therefore gathered initially for a limited period only. High-priority process studies include cloud-radiation-climate interactions, aspects of the global hydrological cycle and air-sea interactions. Climate studies are by their very nature global in character and this necessitates extensive use of space observations to provide the necessary coverage and continuity.

49. The strategy of WCRP continues to be to pursue its objectives through a small number of large-scale

research, observational and modelling projects focused on aspects of climate that are best approached on an international basis. The current projects are the World Ocean Circulation Experiment (WOCE); the Climate Variability and Predictability (CLIVAR) Study; the Global Energy and Water Cycle Experiment (GEWEX); the Stratospheric Processes and their Role in Climate (SPARC) Project; the Arctic Climate System Study (ACSYS); and the Climate and Cryosphere (CliC) Project. Each uses observations from both operational meteorological and other satellites and depends on the planned and proposed new Earth observation satellites to be launched throughout the coming decade. In particular, the coordinated enhanced observing period (CEOP) being developed within GEWEX seeks to constitute an initial step towards establishing an integrated global observing system for the water cycle that responds to both scientific requirements and social needs. To achieve its aims, it will be necessary to make maximum use during 2002-2004 of the new generation of Earth observation satellites, in addition to existing operational ones, through an integrated validation strategy.

50. Climate system monitoring activities within the World Climate Data and Monitoring Programme make use of satellite data for monitoring such parameters as sea level, atmospheric temperature, sea ice, snow cover, solar radiation, aerosol optical depth, albedo and clouds. The WMO World Climate Data Information Referral Service (INFOCLIMA) includes information on some available satellite data sets needed for climate monitoring and research. A climate change detection project has been established under the World Climate Data and Monitoring Programme to advise on the suitability of data, including satellite data, for detecting climate change. The World Climate Applications and Services Programme continues to investigate and promote development of potential uses of satellite data in climate prediction and applications, especially within the framework of the Climate Information and Prediction Services (CLIPS) project.

51. The WMO World Climate Programme publishes on a regular basis information on the global climate system within the framework of projects such as the climate system monitoring and CLIPS projects. The information draws heavily on data received from space-based observation platforms.

52. The WMO Commission for Atmospheric Sciences continues to rely on the use of satellite data for research and for weather analysis and prediction on all time scales. The WMO programmes on weather prediction and tropical meteorology research continue to study the application of high-resolution quantitative satellite data. The newly established World Weather Research programme, focusing on high-impact weather with major socio-economic consequences, has a strong nowcasting component that relies heavily on real-time satellite imagery.

53. As a part of its scientific activities, the WMO Commission for Hydrology has appointed an expert on remote sensing applications in hydrology to evaluate advances in and the application of remote sensing in hydrology, as well as the national capabilities in developing countries to make use of those technologies. The application of satellite-based observation technologies is also addressed by the experts in network design, risk management, hydrological forecasting and technology transfer, as well as by many working groups on hydrology of the six WMO regional associations.

54. WHYCOS is a global programme launched by WMO aimed at strengthening hydrological information systems and further promoting international cooperation to enhance sustainable socio-economic development. WHYCOS is implemented through regional or basin-wide HYCOS components. Within the framework of the programme, some 17 HYCOS components are at various stages of implementation or planning. A key element of many of the projects is the rehabilitation and upgrading of the local hydrological observation networks through the installation of a network of automatic satellite-linked DCPs. Through the WMO Global Telecommunications System (GTS) and other global networks such as the Internet, collected data are made available in near real time to water resource planners, decision makers, scientists and the general public. Within the framework of the two ongoing projects, MED-HYCOS for the Mediterranean rim and SADC-HYCOS for southern Africa, networks of 36 and 42 Meteosat DCPs, respectively, are being installed. AOC-HYCOS started a pilot phase in November 1999. Similar developments are expected during the coming years in other regions, such as eastern Africa, the Caribbean, the South-Western Pacific, the Baltic, the Black Sea, the Aral Sea and the Himalayan region basins, as soon as the

relevant HYCOS components at present being developed are funded and launched.

55. The Data Buoy Cooperation Panel, a joint undertaking of WMO, IOC and all data buoy operators, makes constant use of the satellite-based location and data collection system, ARGOS (which flies on board the NOAA operational satellites as well as the Japanese Advanced Earth Observing Satellite II (ADEOS-II)), for data collection and platform location. The system is also being used in the Argo (Global Array of Profiling Floats) project, which deals with subsurface floats.

56. IOC is working with representatives of member States to improve access to remotely sensed data and their application in the creation of products for the use of decision makers regarding marine environmental questions. As a follow-up of the workshop held in Nairobi in November 2001, proposals will be developed for submission to funding agencies through the African Process during 2002.

57. UNESCO has made available substantial new funding for a cross-cutting intersectoral project on the use of remote sensing and communication technologies for water resources and ecosystems in Africa, which aims at improving access to remotely sensed data and its application in the creation of products for the use of decision makers regarding water resources and ecosystems.

58. IOC, together with ICSU, co-sponsors the activities of the International Ocean Colour Coordinating Group, which investigates new methods for extracting useful environmental information from ocean colour data (e.g. through the development of new algorithms) and provides training for scientists in developing countries in the interpretation of ocean colour data.

59. WMO issues an annual report on the status of implementation of the World Weather Watch. The report includes a section on the space-based portion of GOS, consisting of a network of geostationary and polar-orbiting satellites. The status of satellite technology for application in meteorological observations and telecommunications is considered at each session of the WMO Commission for Basic Systems, which meets on a biennial basis. The last session of the Commission was held in late 2000.

2. Assessment and monitoring of the Earth's environment

60. In 2002, the Office for Outer Space Affairs will continue to support the joint United Nations/ESA training courses follow-up programme on the use of remote sensing technology in sustainable development initiated in 1998 by ESA, the Office and the Department of Economic and Social Affairs of the Secretariat as a follow-up to the series of United Nations/ESA training courses on the use of European remote sensing satellite data. The programme assists selected institutions/organizations in Asia (Viet Nam), Africa (AGRHYMET (Niger and Burkina Faso) and Latin America (Argentina, Bolivia and Chile) in implementing ongoing projects of national or regional importance in the areas of natural resource management, environmental monitoring and sustainable development by providing necessary technical assistance and related hands-on training in the use of remote sensing technology.

61. The Asian element of the programme, on the application of remote sensing technology for coastal zone management, was successfully completed in 2001 and demonstration products in the form of thematic maps were presented to the Government of Viet Nam by the Remote Sensing Centre of the General Department of Land Administration in Hanoi. A project in Africa on the development of an information system for determining, monitoring and assessing flood areas together with establishing an inventory of superficial waters in the Nakambé river basin of Burkina Faso and a project in Latin America on the use of C-band synthetic aperture radar (SAR) and optical data to monitor glaciers and snow cover for optimization of water supply predictive models, study of climatic changes and natural hazards will be continued through the year 2002.

62. ESCAP will develop and implement through a phased approach, within the framework of RESAP II, regional cooperative projects on space technology applications for environmental monitoring. In future years, when resources become available, ESCAP will implement common denominator projects addressing environmental concerns of member countries, including projects on capacity-building in disaggregated poverty mapping and its integration with environment information; promoting regional cooperation for integrated coastal zone management; and

enhancing the capacity for urban and rural development planning.

63. ESCAP will promote and conduct in future years, when resources become available, a regional research project on the utilization of the Advanced Earth Observing Satellite-II (ADEOS-II) and the Advanced Land Observing Satellite (ALOS) data for applications related to Earth's environment.

64. Through its Division of Early Warning and Assessment and the Global Resource Information Database (GRID) network, UNEP maintains linkages with providers and users of remote sensing and information technology applications in many countries to support an assessment framework for reviewing the state of the global environment and environmental issues of international significance. The GRID network now consists of 15 centres. Four of them, the Environmental Assessment Programme for Asia and the Pacific (EAP.AP-Bangkok), GRID-Geneva, GRID-Nairobi and GRID-Sioux Falls, have a UNEP staff presence. GRID-Arendal is operated as a private foundation supported by the Government of Norway, through direct support to UNEP, in accordance with a memorandum of understanding between the partners. The other centres of the GRID network are at the following locations: the International Centre for Integrated Antarctic Research, Christchurch, New Zealand; the National Institute for Environmental Studies, Tsukuba, Japan; the International Centre for Integrated Mountain Development (ICIMOD), Kathmandu; the National Institute for Space Research (INPE), São José dos Campos, Brazil; the Canada Centre for Remote Sensing, Ottawa; the Environmental Information Centre, Warsaw; the Ministry of the Environment, Budapest; the Blue Plan Office Regional Activity Centre of the Mediterranean Action Plan (MAP), Sophia Antipolis, France; Moscow, within the Russian Federation's Ministry of Natural Resources; and the Ministry of the Environment in Tbilisi. The results of activities of those centres are shared through the GRID network and archived at the regional GRID centres in Bangkok, Geneva, Nairobi and Sioux Falls.

65. Through its Division of Early Warning and Assessment, UNEP has embarked on a major new information system development in conjunction with the Environmental Systems Research Institute (ESRI) in Redlands, California, United States, and a number of other partners. The system, known as UNEP.Net, will provide a single point of access to a vast array of environmental data and information and related output products available in various forms from UNEP and its assessment networks, as well as those from a number of close partner organizations. The development of UNEP.Net was initiated at a meeting in Redlands in October 2000, where more than 30 persons from the Division of Early Warning and Assessment and other divisions of UNEP and ESRI conceived the system and planned its development. The system is based on Internet map server technologies, such as "dynamic maps", and related state-of-the-art software technologies that serve to access, analyse and acquire environmental data and information, such as satellite imagery and related products, at various geographical resolutions and scales.

66. UNEP.Net is a long-range strategic effort, but there is already an immediate and intensive campaign under way by the Division of Early Warning and Assessment and its various regional GRID and other centres to develop and bring online environmental data mapping services. These will initially be located at UNEP headquarters in Nairobi and gradually thereafter will be introduced in the various regions served by the organization. The prototype version of UNEP.Net was presented to the Governing Council of UNEP at its twenty-first session, in February 2001. A medium-term build-up phase foresees development of additional applications and the integration of services hosted at different UNEP and partner locations. That integration will emphasize extension of services across the entire UNEP programme to other divisions. In mid-2001, GRIDs-Arendal, Bangkok, Geneva, Nairobi, Sioux Falls and the World Conservation Monitoring Centre, in collaboration with UNEP regional offices, were mandated to develop regional and thematic data portals for UNEP.Net. For example, GRID-Geneva assumed either full or partial responsibility to oversee or carry out the initial development of no less than five of the regional and thematic "portals", including for Europe, West Asia, early warning/environmental vulnerability and socio-economic and urban environment, as well as ongoing maintenance and improvement of the "GEO Data Portal" containing the "core data sets" (and thus becoming the socio-economic portal of UNEP.Net). UNEP.Net is to enter a relatively stable operational period throughout most of the biennium 2002-2003. Towards the end of that period, by mid-2003, a cycle

of review and evaluation will then lead to planning the next phase of service.

67. Through the "GEO Data Portal" online environmental database (http://geo3.grid.unep.ch), GRID-Geneva is providing UNEP collaborating centres involved in the preparation of the flagship publication, the Global Environment Outlook (GEO), access to a common and consistent set of major global and regional core data sets from a wide variety of recognized sources. By the end of 2001, the Data Portal held more than 250 environmental data variables covering a wide variety of subjects for the time period 1972-2002. In addition, a considerable selection of geospatial data sets, such as land cover and population density maps were also made available online. The unique gateway will be incorporated into UNEP.Net during 2002, thereby enabling users to conduct their own environmental assessments using reliable and verified data.

68. GRID centres continue to produce, add value to and disseminate data sets useful for environmental assessment. UNEP will place greater emphasis on bringing the centres closer together and is considering the creation of a steering committee to oversee the development of a more integrated operation. The GRID centres continue to serve as the foundation for UNEP Environment and Natural Resources Information Networking (ENRIN) projects, implemented by co-operation agreements with governmental and inter-governmental organizations in developing countries and countries with economies in transition to create environmental assessment and reporting networks. ENRIN projects are intended to promote the flow of information on environmental assessment between partner institutions and UNEP; provide for policy and planning consultations related to international environmental assessment and reporting; and provide a vehicle to catalyse and facilitate capacity-building of participating institutions.

69. UNEP will continue to operate its North American node of GRID as a key centre for land cover assessment in cooperation with the United States National Aeronautics and Space Administration (NASA), the United States Geological Survey (USGS), the United States Forest Service (USFS) and the United States Environmental Protection Agency (EPA).

70. Through GRID-Sioux Falls, UNEP will maintain access to the world-class expertise and unique facilities of the USGS Earth Resources Observation Systems (EROS) Data Center (USGS-EDC), EPA, NASA and USFS, in the use of applied data and information technology for the benefit of developing countries. UNEP, through GRID-Sioux Falls, has been active in the design, development and timely delivery of scientifically credible information products, recognizing that it is a formidable challenge to provide decision makers with information useful for environmental planning, management and policy formulation in a timely manner and understandable formats. USGS-EDC is the largest satellite data centre in the world, with about 600 scientists. Extensive partnerships with the private sector, non-governmental organizations, scientific bodies and academic institutions have been established. The Center has an active programme dealing with integration and analysis of data sets from multiple sources to derive policy-relevant information about freshwater, biodiversity loss, land cover changes and population-environment interactions. Activities include monitoring of environmental hot spots around the world using satellite data, assessing the status of the world's remaining closed forests, rapid response to environmental emergencies, environmental vulnerability assessment and integrated river basin assessment.

71. GRID-Sioux Falls started an initiative related to the Atlas of Global Change to document changes over the last 30 years using satellite data. The atlas will incorporate satellite imagery, maps, ground photographs and text. The project goal is to educate policy makers and the general public about the environmental situation in specific locations throughout the world. Environmental topics may include water issues, deforestation, desertification, disasters, fires, urbanization and agriculture-related issues.

72. GRID-Sioux Falls continues its work on an assessment of the world's transboundary protected areas by geographical location and protection status. The basic goal is to identify the continental distribution of transboundary protected areas to provide a basis for international cooperation. By combining several factors, such as land cover and population density, it is hoped to identify transboundary protected areas that will be at highest risk of degradation in the future.

73. GRID-Sioux Falls continues its work on integrating ground-based data and spaceborne images for the assessment of transboundary movement of

pollutants as an early warning system. It also continues to develop a Global Environment Facility (GEF) Programme Tracking and Mapping System. The project leverages advanced Internet technology to connect all GEF projects and enable them to communicate, exchange information and perform activities that cut across agency boundaries. The GEF secretariat's project tracking system was released on the GEF web page under "Project map" (http://www.gefweb.org).

74. Through EAP.AP-Bangkok, UNEP distributes copies of the Asia-Pacific mosaic based on 1993 NOAA advanced very high resolution radiometer (AVHRR) high-resolution picture transmission data obtained from USGS-EDC, the NOAA National Environmental Satellite, Data and Information Service, the National Research Council of Thailand, the State Meteorological Administration/Satellite Meteorology Centre of China, GRID-Tsukuba, the Centre for Environmental Remote Sensing of Japan and Chiba University in Japan. The mosaic is available for downloading at http://www.rrcap.unep.org/lc/cd/html/mosaic.html In addition, through EAP.AP-Bangkok, UNEP also distributes an Indian Remote Sensing Satellite (IRS) Wide Field-of-view Sensor (WiFS) mosaic for Cambodia, northern India, the Lao People's Democratic Republic, Myanmar and Thailand. EAP.AP-Bangkok, together with the European Community Joint Research Centre, has completed a research project to test the usefulness of VEGETATION data for forest cover monitoring in Indochina.

75. UNEP has for five years operated Mercure, a satellite-based telecommunications system operating through the International Telecommunications Satellite Organization (INTELSAT). Mercure was designed to improve global access to environmental information and provides key infrastructure for the UNEP environmental information Internet, UNEP.Net. It uses INTELSAT satellites in geosynchronous orbit over the Indian and Atlantic Oceans. Eight high-capacity Earth stations operated at six cities around the world serve the information management needs of national and regional environment authorities and UNEP headquarters and regional offices. Nine lower-capacity stations established in nine cities around the world serve the information management needs of national environment agencies. The Mercure collaboration centred on a five-year agreement between UNEP and European donors, which came to an end in November 2001. At that time, UNEP transferred ownership of ground stations to the partner States that had been hosting them and has reduced operations to a single link between Europe and Kenya to support United Nations operations in Nairobi.

76. The UNEP Regional Office for West Asia is supporting the Regional Organization for the Protection of the Marine Environment (ROPME) in the establishment of a remote sensing receiving station for the ROPME sea area. The station would provide data on the characteristics and dynamics of natural freshwater, coastal and marine resources and habitats and the ongoing discharges of oily and other wastes into the marine environment through the acquisition of satellite data on a region-wide scale and provide information and/or image analyses and interpretation to member States. Using RADARSAT space technology coupled with the European Remote Sensing (ERS)-1 and 2 satellites and NOAA-AVHRR, the station would provide the region with a powerful system that has a wide geographical coverage, longer observation time and the ability to observe and track oil spills for a longer period and to map and follow up coastal changes, assess habitats, measure oceanographic parameters, such as chlorophyll, temperature and turbidity, and map terrestrial ecosystems. Training and exchange of experience and expertise in the region is another major objective of the project in establishing the station. The Organization of the Petroleum Exporting Countries and the Arab Fund for Economic and Social Development have approved contributions for the station. UNEP and ROPME are in discussion with the Islamic Development Bank and GEF on developing the proposal further in order to meet their funding conditions. Emphasis has been placed on the benefits of the project in protecting biodiversity and commercially important species of fish and shrimp and on the linkage between the station and existing national centres. A greater commitment by member States to the operational phase of the project was also considered necessary.

77. UNEP is in the process of establishing a regional resource centre for early warning and assessment for West Asia. The project will institutionalize environmental assessment and early warning in West Asia at the national, subregional and regional levels. This will enable a more coherent and coordinated structure to strengthen capacity-building for environment assessment and early warning, reporting and

information management to support policy and informed decision-making in the context of sustainable development. It is intended to fulfil two main streams of needs, being mutually interlinked, with one end servicing the other and vice versa. One is to directly support UNEP needs for environment assessment and early warning and the other is to support and service those same needs at the regional and national levels within the West Asian region.

78. The centre will work by pooling the resources of many assessment and information institutions, such as research centres, academic institutions, remote sensing and GIS facilities, information centres, specialized agencies, non-governmental organizations (including associations and forums) and the private sector, within a regional framework to bring about coherent and harmonized actions.

79. The strategy of the centre is to be based on UNEP's approach of an integrated observing, assessment and reporting framework. Thus, the centre will support the process at "nested" geographical scales from regional to national, with integration into the global framework and will initiate the development of a regional cooperative environment assessment and early warning network, as an integral part of the global UNEP framework, which is vital in order to fulfil its assessment mandate.

80. Negotiation is under way with the Arabian Gulf University to host the centre at its premises. The University is a regional academic institution, which has been a UNEP collaborating centre for the GEO process in West Asia since GEO-1 (1995).

81. The centre's activities will focus on assessment and reporting, including support for the GEO process, producing regional reports on the state of the environment, supporting other assessments such as the regional preparatory assessment for the World Summit on Sustainable Development, the Millennium Assessment and assessment of key regional eco-regions. Other key activity areas are early warning, capacity-building and technical assistance, data and information management and networking. At the heart of those activities will be development of Internet Web sites, GIS systems, remote sensing and other information technology tools, which will serve and support the functions of the centre.

82. The UNEP Regional Office for West Asia (ROWA), ROPME, the Arab Centre for Studies of Arid Zones and Dry Lands (ACSAD), GRID-Geneva and GRID-Sioux Falls are carrying out a comprehensive scientific assessment of the Tigris-Euphrates river basin, including the associated marine area of the northern Persian Gulf. The project is entitled "Evaluation of Land Cover/Use Changes in the Tigris-Euphrates Basin and the Wetlands of Lower Mesopotamia, including the northern Persian Gulf". Each of the parties is providing input on a priority issue facing the region. GRID-Geneva and GRID-Sioux Falls are to carry out a land cover change detection analysis of the Mesopotamian marshlands and the headwater region in Turkey respectively. The Arab Centre for Studies of Arid Zones and Dry Lands is to provide hydrological data and prepare a report on the basin's water resources. Finally, ROPME is to analyse the data and produce a report on the state of the coastal and marine environment, with GRID providing 43 Landsat satellite images to assist in the surveys.

83. The first output of the project is an assessment report entitled "The Mesopotamian Marshlands: Demise of an Ecosystem", prepared by GRID-Geneva in collaboration with GRID-Sioux Falls and the UNEP Regional Office for West Asia and published in August 2001. Based on an analysis of satellite imagery, the study shows that 85 per cent of the marshlands—the largest wetland in the Middle East and one of the most outstanding freshwater ecosystems in the world—have been lost. The desiccation of the marshlands, which originally covered between 15,000 and 20,000 square kilometres, is attributable to two main causes: upstream dams and drainage schemes. A small northern fringe of the wetland system straddling the border between the Islamic Republic of Iran and Iraq is all that remains of the marshlands.

84. The Arab Centre for Studies of Arid Zones and Dry Lands has prepared a draft report entitled "Surface Water Resources in the Euphrates and Tigris River Basins" which is to be finalized by early 2002. GRID-Sioux Falls will also be completing its study of the headwater region in Turkey. An assessment of the state of the marine environment in the northern Persian Gulf, which is connected to the Tigris-Euphrates river system both hydrologically via the Shatt al-Arab estuary and through the migration of aquatic species, will be made by ROPME. The studies are to serve as

background documents for the development of an integrated regional programme of action for water resource management involving all riparian countries. The programme will emphasize a country-driven approach, including monitoring and assessment of river and estuarine water quality, monitoring of river discharges and uses and basin management.

85. UNEP continues to provide a number of CEOS-related information services intended to increase environmental applications of Earth observation data. UNEP hosts sites of the CEOS International Directory Network (IDN) in Hungary, Kenya and Switzerland. UNEP has also adopted the CEOS Information Locator System (CILS) as a core item of its information servicing infrastructure. IDN and CILS are outcomes of the Working Group on Information Systems and Services of which UNEP is currently user vice-chair. IOC also cooperates closely with CEOS in the activities of the Working Group. UNEP is also very active in CEOS-based activities relating to metadata for spatial data, including Earth observation data sets. UNEP now represents the Working Group in the technical committee on spatial metadata of the International Organization for Standardization.

86. UNEP continues to provide technical backstopping assistance to Eritrea, Ghana, Kenya, Lesotho, Uganda, the United Republic of Tanzania and Zambia. Continuing cooperation in the development of environmental information systems in Africa is coordinated through the Advisory Committee on Environmental Information Systems in Sub-Saharan Africa. Sponsored by the World Bank, UNEP, the UNDP Office to Combat Desertification and Drought, the German Agency for Technical Cooperation (GTZ), USAID and the Norwegian Agency for International Development, the Advisory Committee provides a forum for coordination and the exchange of ideas.

87. UNEP also cooperates with the FAO Regional Office for Africa in Accra in strengthening institutional capacities for developing coastal and marine environmental databases for some countries along the west African coast, such as the Gambia, Ghana and Guinea.

88. Through GRID-Arendal, UNEP is continuing to maintain the Baltic Sea catchment area database. The database can be accessed through the Internet and the World Wide Web.

89. Through its Global International Waters Assessment office in Kalmar, Sweden, and supported by GRID-Arendal, UNEP will maintain an international water assessment gateway within the framework of UNEP.Net. Also through GRID-Arendal, UNEP will further develop a gateway to Arctic environmental and natural resource data and information sources, in close cooperation with the working groups under the Arctic Council and the Arctic research community. In cooperation with other United Nations agencies and organizations and through GRID-Arendal, UNEP will develop the first global assessment on loss of biodiversity due to human activity, based on recently available global GIS data sets.

90. UNEP, through EAP.AP- and GRID-Bangkok, has completed the Coastal and Marine Environmental Management Information System for the South China Sea Area, covering Cambodia, southern China and Viet Nam and continues to work on further development of the North-West Pacific Action Plan of the UNEP Regional Seas Programme.

91. Subject to the availability of finances, UNEP will continue to seek opportunities to offer short-term fellowships to appropriate persons from developing countries to work at GRID-Sioux Falls and to develop or analyse data sets relating to environmental issues in their home countries.

92. UNEP and UNESCO will continue to work with the ICSU Scientific Committee on the Problems of the Environment.

93. Preserving the Earth's biodiversity has become a matter of global significance. One of the key means of attaining success in the field is increasing knowledge and awareness about biodiversity among the public (especially youth). The issue has been addressed recently by UNEP/GRID-Warsaw through its initiative to create a specially designed multimedia educational programme entitled "Biological Diversity in Poland". The programme will be distributed free of charge to secondary schools in Poland. Its main purpose is (a) to increase environmental knowledge and awareness among students; (b) to promote pro-environmental attitudes and practices; and (c) to foster understanding of the importance of biodiversity and the need for its protection. Even though the programme mostly presents biodiversity in Poland, numerous references have been made to regional and global biodiversity issues. For maximum educational impact, emphasis has

been placed on presenting the knowledge in a systematic, comprehensive and attractive format. One of the prime examples of such an approach is to employ satellite images as one of the means of detecting, monitoring, analysing and assessing natural processes occurring on Earth.

94. Building environmental awareness and pro-environmental attitudes among the public is frequently based on the "think globally—act locally" principle, where knowledge about one's own area or country is linked to global phenomena. The rapid development of information technology and the availability of computers has opened new possibilities for creating and utilizing novel tools for environmental education. The Electronic Atlas of Environment in Poland is a multimedia presentation programme developed by UNEP/GRID-Warsaw. The main idea behind creating the atlas was to increase knowledge of Polish nature and environmental awareness among the youngest members of society, although it can well serve a wide variety of users seeking quality, comprehensive environmental information in an attractive, user-friendly and highly interactive package. A number of different multimedia tools (thematic maps, diagrams, tables, text, photos and animations) enable easy and highly functional access to geographical data. Despite focusing on the territory of one country, much of the environmental and geographic information contained therein is depicted on a broad regional, European and global scale. Efforts are under way to have the atlas translated into English, as it can also serve as a model environmental education tool in other countries.

95. UNHCR is currently developing a framework for environmental assessments and monitoring methodologies using a combination of traditional field surveys, satellite imagery and GIS to develop indicators for undertaking sound environmental projects. The project is supported by the French Fund for the Global Environment and UNHCR.

96. Within the framework of the Man and the Biosphere Programme, UNESCO will continue to cooperate with UNEP, FAO, WMO and the International Geosphere-Biosphere Programme of ICSU concerning GTOS, notably through its World Network of Biosphere Reserves (411 sites in 94 countries). Two initiatives are at present being developed, the first of which deals with the use of biosphere reserves as ground truth sites for the GTOS project on net primary productivity, which is coordinated through the international long-term ecological monitoring programme, in cooperation with NASA. Additionally, 125 biosphere reserves have been selected for possible inclusion in the GTOS terrestrial ecosystems monitoring sites exercise. The second is the development of a biosphere reserve integrated monitoring programme aimed at integrating biodiversity, environmental and social monitoring within biosphere reserves and related findings, including information obtained by remote sensing and GIS applications.

97. Within the framework of the Man and the Biosphere Programme, UNESCO will continue to cooperate with the Sahara and Sahel Observatory (OSS) in the creation of an ecological observatory network, ROSELT, in Africa. UNESCO will assist, in particular, in introducing the use of space technology for monitoring fragile ecosystems in dry lands, semi-arid and arid regions. During the International Year of the Mountains in 2002, UNESCO will initiate international research projects on new methodologies for the rehabilitation of mountain ecosystems using remote sensing and GIS technologies.

98. As sponsors of the Diversitas Programme (an international programme on biodiversity science) and as a follow-up of the International Biodiversity Observation Year in 2001, UNESCO, ICSU and several ICSU affiliates will promote biodiversity activities with strong remote sensing and GIS components.

99. UNESCO created the Regional School on Integrated Tropical Forest Management (ERAIFT) in 1999 in cooperation with UNDP, Belgium, the European Commission and several countries of the Sub-Saharan Africa and Indian Ocean region. The Regional School, which is located at the University of Kinshasa, has established a remote sensing/GIS mapping laboratory for postgraduate students in management of African tropical forests.

100. In cooperation with the International Institute for Aerospace Survey and Earth Sciences (ITC) and the World Wildlife Fund, UNESCO is developing a training programme on remote sensing and GIS for the rehabilitation of panda habitats in China. The training programme is for both scientists and managers.

101. UNESCO actively supports the Global Monitoring for Environment and Security (GMES) initiative of the European Union and ESA, which seeks

to bring the needs of society for information associated with the issues of environment and security together with the advanced technical and operational capability offered by terrestrial and space-borne observation systems. Besides ensuring European access to independent information on the environment at the global, regional and local levels, the initiative also addresses such issues as crisis management and humanitarian aid. UNESCO is a member of the EURISY Programme Committee for the preparation of the Conference on GMES Services and Benefits to Users, to be held in late 2002.

102. ITU will participate in two pilot projects initiated by Tunisia entitled "Establishment of a terrestrial and space telecommunications infrastructure for an integrated information system on the environment and sustainable development in Tunisia" and "Establishment of a satellite-based network for the remote monitoring of sea water quality".

103. In collaboration with UNITAR, the ITU Telecommunication Development Bureau (BDT) has organized several subregional training seminars in Africa on the development and use of telecommunication and information technology for protection of the environment and sustainable development.

104. ITU/BDT is collaborating with the Sahara and Sahel Observatory and UNITAR for the preparation of the project document for the second phase of the Environmental Information System on the Internet for Africa (SISEI). Two meetings, organized by ITU/BDT in Geneva, jointly with the Sahara and Sahel Observatory and UNITAR, were held in March and October 2001 respectively with potential sponsors and partners and the beneficiary African countries. The project document was adopted at the first meeting and the project and the associated campaign for the mobilization of resources were officially launched at the second. This second phase is expected to run from 2002 to 2005.

105. ITU/BDT and UNEP are supporting a new initiative among information and communication technology service providers and suppliers, the Global *e*-Sustainability Initiative. Through the Initiative, the information and communication technology industry aims to help improve the global environment and to enhance human and economic development and thereby make a key contribution to a global sustainable future. The Initiative was officially launched on 5 June 2001 in Turin, Italy, on World Environment Day.

106. WMO continues to provide valuable data and assessments concerning atmospheric status under the Atmospheric Research and Environment Programme through GAW, which it established in 1989 as a long-term monitoring and research system to detect changes in the composition of the atmosphere on global and regional scales. Work includes monitoring and research on pollutants, acid deposition and greenhouse gases, including ozone, aerosols and other trace substances in the atmosphere that may lead to global climate change. GAW data include surface and vertical observations, which provide the information required to verify satellite-based measurements of selected atmospheric constituents. In particular, through its more than 150 total ozone monitoring stations, GAW has furnished critical ground truth data to calibrate ozone observations from space. Those satellite observations, in turn, provide vital information used in the preparation of near real-time ozone bulletins on the state of the ozone layer during both the austral spring and the northern hemisphere winter. In addition, using four-dimensional variational assimilation techniques, major global numerical weather forecasting centres are starting to assimilate real-time ozone observations from satellites as well as ground-based measurements, in order to improve the analysis of stratospheric winds and ozone radiative effects. Such activities will benefit from better cooperation with space observing programmes and, in that respect, a new integrated global atmospheric chemistry observation theme is being developed within IGOS for the monitoring of atmospheric chemical components such as ozone and greenhouse gases.

3. Management of natural resources

107. The ECE Environment and Human Settlements Division will continue to develop the use of remote sensing and GIS for land use/land cover information for specific applications in the region and in particular with reference to the ECE multilateral environmental agreements. For example, monitoring implementation of the Convention on Long-range Transboundary Air Pollution requires harmonized land use maps in order to identify impacts across the region; those maps also need to be harmonized with mapped land use

information to be used for modelling of pollutant deposition.

108. ESCAP will develop and implement, within the framework of RESAP II, regional cooperative projects on space technology applications for natural resource management. ESCAP, in close cooperation with FAO, will implement in 2002 and beyond the common denominator project on development and applications of a multi-purpose environmental and natural resource information base for food security and sustainable development in the ESCAP region. ESCAP will continue to implement common denominator projects for the sustainable management of the natural resources of its member States, including projects on integrated land and water resource management, crop monitoring and agricultural production forecasting. In future years, when resources become available, ESCAP will develop and implement projects on the mapping for groundwater potential and identification of recharge zones, potential offshore fishery area delineation and inland aquaculture development and cropping system and precision farming studies.

109. ESCAP will hold the annual meeting of the Regional Working Group on Remote Sensing, Geographic Information System and Satellite-based Positioning in Beijing in 2002. The venue of the annual meeting in 2003 is to be determined.

110. Through GRID-Geneva, UNEP continued work on a project related to biodiversity mapping in Madagascar. The broad objective of the project is to develop a method to map and qualify biodiversity, which will be part of an efficient and user-friendly GIS to manage biodiversity data in relation with other environmental information, for instance the location and intensity of forest fires and wildfires. The more specific aims of the project are (a) to examine different methodologies used for land cover mapping (such as the FAO Land Cover Classification System); (b) to make existing land cover data comparable and thus more effective for analyses of land cover and land cover changes at the regional or global levels; and (c) to derive biodiversity-related information from land cover maps. In order to achieve this, GRID-Geneva is producing a land cover and biodiversity map for the northern part of Madagascar.

111. Through EAP.AP-Bangkok, UNEP continues to undertake land cover assessment and monitoring studies with subregional and national agencies. It has completed the assessment and monitoring of 12 countries (Bangladesh, Cambodia, Islamic Republic of Iran, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Thailand and Viet Nam) with NOAA-AVHRR data and is currently performing land cover analysis of Bhutan and Sri Lanka. UNEP has also prepared through EAP.AP-Bangkok a new publication on land use/land cover change in South-East Asia, which is being distributed free of charge. A compact disc containing data and publications relating to land cover projects has been prepared and is now available on request. The contents of the compact disc are also available online on the EAP.AP web site (http://www.eapap.unep.org/lc/cd/html/assess_monitor.html). EAP.AP-Bangkok has also initiated the land use/land cover mapping of Greater Mekong subregion countries using both large resolution (Landsat Thematic Mapper) and coarse resolution (NOAA-AVHRR) data.

112. Having completed the World Soils and Terrain Digital Database (SOTER) on the scale 1:5,000,000 for Latin America, UNEP, together with the International Soil Reference and Information Centre and FAO, continues to advance the work on and coverage of SOTER.

113. Environmental information systems are one of the key tools used worldwide in environmental resource management of national parks. UNEP/GRID-Warsaw is in charge of developing the GIS for Karkonosze National Park. The project constitutes a milestone in the process of standardization and unification of GIS methodology that is to be implemented in all Polish national parks within a few years' time. The project will yield a database and a set of computer application tools that will make possible effective management of natural and cultural resources of the park, in line with its protection plan. It will also help monitor human activities and predict possible threats to and disturbances in the Karkonosze environment. The global dimension to the project is evidenced by the fact that Karkonosze National Park holds Man and the Biosphere Reserve status.

114. Since 1996, the World Bank and FAO have been implementing the Regional Environmental Information Management Project in Central Africa. The project aims at improving and strengthening the planning and management of natural resources in the countries of the Congo basin by providing the various stakeholders

with appropriate environmental information. The project involves some 100 organizations from the public, private and non-governmental sectors, which all work in a national and regional network structure. FAO is the lead agency for the normative as well as the technical control activities of the project, which is supported by a multi-donor fund of more than $10 million involving Belgium, Canada and France, the World Bank, the European Union and GEF. The main recent activities of the project include: (a) the preparation of a number of geodatabases and reviews on the environment, forests and land use; (b) capacity-building, provision of equipment and training; and (c) establishment of Internet-based thematic networks on the main environmental priorities of the subregion (biodiversity, forestry and coastal zones). Particular attention is paid in the project to involving the users of information at all decision-making levels. UNHCR is a partner within the framework of the project and will provide standard procedures and integrate geographical information for refugee contingency planning activities.

115. The FAO Environment and Natural Resources Service has operated the AFRICOVER project since 1995. The project aims to establish a digital land cover database for selected subregions in Africa. It produces land cover maps on the scale 1:250,000 (1:1,000,000 and 1:100,000 in certain cases), using the same geographical references and projection system in Africa, as well as a common harmonized legend, with updated information on features including drainage, toponymy, roads and land cover. The project has been implemented through close cooperation between regional and national remote sensing centres and mapping agencies in Africa under the supervision of FAO. A further two-year phase of the AFRICOVER East Africa project was approved by the Government of Italy in August 2000 with a focus on the application of access to and distribution of established AFRICOVER data sets and application of the Land Cover Classification System methodology at the national, regional and global levels. FAO also cooperates with the European Commission Joint Research Centre, UNEP and UNESCO by participating in working groups on the harmonization of land use and land cover classification.

116. FAO implements a number of GIS analysis and applications projects. These include: (a) preparation of the GIS vector and raster versions of the FAO/UNESCO soil map of the world; (b) estimation of available arable lands for the major FAO study entitled "Agriculture Towards 2010"; (c) analysis of the suitability of inland aquaculture sites of Africa and South and Central America for fish farming potential; (d) soil suitability analysis studies for various crops in Africa; and (e) a dominant land resource map for Africa.

117. The UNESCO Division of Earth Sciences will continue to carry out the Pan-African Network for a Geological Information System (PANGIS) project, which is standardizing the geoscience databases of African countries to facilitate the collection, electronic exchange and retrieval of geodata for better resource management and sustainable planning and development. In Asia, the first phase of the South-East Asian Network for a Geological Information System (SANGIS) project is being implemented; a regional workshop on geodata handling is foreseen in 2002-2003. The above projects are carried out by UNESCO in cooperation with the Commission on the Management and Application of Geosciences Information of the International Union of Geological Sciences, the International Centre for Training and Exchanges in Geosciences, France, and the Royal Museum of Central Africa, Belgium.

118. UNESCO will continue to support international postgraduate courses on the geological, geophysical and coastal zone applications of remote sensing and GIS technologies organized by ITC.

119. Within the framework of the Man and the Biosphere Programme, UNESCO will continue to organize training courses on remote sensing and GIS technologies for biosphere reserve managers in developing countries and to develop pilot projects on the operational use of GIS. Remote sensing and GIS technologies were introduced in biosphere reserve management by UNESCO in cooperation with Conservation International, Intel (United States) and the Nippon Electric Company (Japan).

120. The UNESCO Coastal Regions and Small Islands Unit has produced the seventh computer-based Bilko software learning module on the applications of satellite and airborne image data to coastal management. The module is available in CD-ROM and on the Internet (http://www.unesco.bilko.org). Moreover, a remote sensing handbook for tropical coastal management has been produced and is being distributed free of

charge. A new computer-based learning module will be produced in 2002 on the use of multi-sensor, multi-temporal remote data sets for fisheries.

121. The World Water Assessment Programme, a United Nations system-wide programme whose secretariat is located in the UNESCO Division of Water Sciences, will make considerable use of remote sensing and GIS technologies such as in the assessment of surface water, soil moisture, groundwater distributions both for water availability and for assessing the impact of floods and droughts and assessment of uses of water, such as forestry and agriculture. GIS will be used extensively as a tool for data intercomparisons within specific geographical units, for example, overlaying of water availability maps with maps of water use.

122. In the framework of the UNESCO/International Union of Geological Sciences Geological Applications of Remote Sensing programme, the UNESCO Division of Earth Sciences will organize regional workshops in the Arab region in 2002 and 2003 on the use of remote sensing and GIS technologies related to the study of geological parameters that influence desertification and on management of transboundary groundwater aquifers. In cooperation with the UNESCO International Hydrological Programme, a session on remote sensing and GIS applications will be organized during the International Workshop on Transboundary Aquifer Systems, to be held in May 2002 in Tripoli. In cooperation with EURISY and the Royal Centre for Remote Sensing (CRTS) of Morocco, a symposium on improving water resource management and desertification control using space-based information will be held in Rabat on 21 and 22 March 2002.

123. UNESCO will assist in strengthening the remote sensing and GIS infrastructure of the Libyan Arab Jamahiriya by organizing training courses aimed at improving the study of the country's hydrological and geological resources.

124. UNESCO, FAO, the International Association of Hydrogeologists and ECE have established a collaborative programme on internationally shared aquifer resource management to improve understanding of the scientific, socio-economic, legal, institutional and environmental aspects of regional groundwater resource management. The programme will draw on expertise from the Geological Applications of Remote Sensing programme regarding data fusion and use geological mapping information in the framework of the UNESCO/Commission for the Geological Map of the World cooperation. The programme will also produce documentation on the application of remote sensing and GIS technologies to the evaluation and management of transboundary aquifer systems.

B. Using space applications for human security, development and welfare

1. Enhancing disaster reduction capability

125. The IGOS partnership, including FAO, UNESCO, ICSU, IOC, UNEP, WMO and IGFA, endorsed the Disaster Management Group, established under CEOS, to continue its work on disaster management and supported the close interaction with the inter-agency secretariat for the International Strategy for Disaster Reduction (ISDR) and the Office for Outer Space Affairs on the subject matter.

126. "The Space Millennium: Vienna Declaration on Space and Human Development",[2] adopted by UNISPACE III and endorsed by the General Assembly in its resolution 54/68, called for action, among other things, to implement an integrated, global system, especially through international cooperation, to manage natural disaster mitigation, relief and prevention efforts, especially of an international nature, through Earth observation, communications and other space-based services, making maximum use of existing capabilities and filling gaps in worldwide satellite coverage. In response to that call, the Office for Outer Space Affairs, within the framework of the United Nations Programme on Space Applications, has undertaken to organize a series of workshops on the use of space technology in support of disaster management. The objectives of the workshops are: (a) to increase the awareness of managers and decision makers involved in disaster management of the potential benefits and the cost-effectiveness of using space technologies; (b) to determine the types of information and communications needed in managing specific disasters and the extent to which they could be provided using space technologies; and (c) to develop a blueprint of actions that could lead in the near future to pilot projects whereby interested national institutions responsible for disaster management incorporate and

test the use of space tools. The pilot projects would be designed and carried out through international cooperation. The process will seek to establish synergies among initiatives that are being carried out on the same theme by various institutions or groups of institutions.

127. The first in the series of workshops was organized in La Serena, Chile, in 2000, with the co-sponsorship of ESA and the Government of Chile, for the benefit of countries of Latin America and the Caribbean. The participants identified 16 disaster themes, including forest and grassland fires, earthquakes and tsunamis, volcanic eruptions, flooding, cyclones, droughts, landslides, impact to marine and coastal systems and oil spills. For 13 of the 16 themes, at least one institution involved in disaster management was willing to become leader of a team that would develop a pilot project proposal. It is expected that in 2002 pilot projects will be consolidated for further support and implementation. Similar workshops are being planned in 2002 for Africa and Asia and the Pacific and in 2003 for the regions of Western and Central Asia, and Eastern and Central Europe.

128. In 2002, the Office for Outer Space Affairs, within the framework of the United Nations Programme on Space Applications, will organize a workshop on the use of International Satellite System for Search and Rescue (COSPAS-SARSAT) satellite for the benefit of the countries in the coverage of the Indian receiving station in Bangalore.

129. The Office for the Coordination of Humanitarian Affairs, in close collaboration with the United Nations Geographic Information Support Team (GIST) members, is developing a tool box to facilitate the use of geographic information products and remotely sensed high-resolution raster imagery in support of logistical planning and response in times of emergency.

130. The Office is collaborating closely with academic institutions such as the International Research Institute for Climate Prediction at the Lamont Doherty Earth Observatory of Columbia University (United States) to develop a "Hot Spots Project", which is intended to identify where disasters are most likely to occur, the elements (people, economic activities and infrastructure) most likely to be affected and cost-effective measures for reducing or transferring disaster risks. The report of the project will consist of cartographic representations derived from GIS analysis, descriptions of the data and analytical methods employed and an interpretation of the results and other factors as a guide in allocation and deployment of international resources for disaster management. Operational field pilots to test the outcomes of the study are also under discussion.

131. In 2001, ISDR continued its system-wide attempt to bring about an inter-agency and multidisciplinary mechanism to implement effective disaster reduction measures with a view to creating disaster-resilient communities in the future. The recent progress of the ISDR programme is illustrated in the report of the Secretary-General of 11 July 2001 (A/56/68-E/2001/63 and Corr.1). In that context, the ISDR secretariat has continued to work in close collaboration with the Office for Outer Space Affairs in order to explore the potential of space applications for disaster reduction.

132. On the basis of the agreement for inter-agency collaboration concluded in 2000 with the Office for Outer Space Affairs, the secretariat for ISDR has continued to maintain close contact with the Office, among other things sharing information and providing input in programmes and activities involving the use of satellite applications for disaster reduction. The secretariat for ISDR has also provided assistance to the Office in the formulation of and preparations for a series of regional workshops being held in the framework of the follow-up to activities of the CEOS Disaster Management Support Group.

133. With regard to the work of the Inter-Agency Task Force on Disaster Reduction, which is the forum within the United Nations system for the discussion of disaster reduction matters at the policy level, the secretariat for ISDR has continued its efforts to raise the profile of satellite applications for disaster reduction. At its fourth meeting, held in Geneva on 15 and 16 November 2001, the Inter-Agency Task Force considered an agenda item on space applications, which included presentations from the Disaster Management Support Group and the Office for Outer Space Affairs. The participation of the latter in the meeting of the Inter-Agency Task Force was considered necessary in order to operate a formal linkage between the work of ISDR and that of the Committee on the Peaceful Uses of Outer Space, as well as to associate the Office with the work of the Task Force.

134. Within the framework of RESAP II, ESCAP will develop and implement, when resources become available, regional cooperative projects on space technology applications for natural disaster monitoring and mitigation at the national and regional levels. These include projects on capacity-building for disaster management in Asia and the Pacific, applications of meteorological satellite data and information products for sustainable development and joint regional research using satellite technology on monitoring and assessment of the impact of the Asian monsoon.

135. ESCAP will hold the annual meeting of the Regional Working Group on Meteorological Satellite Applications and Natural Hazards Monitoring in Beijing in 2002. The venue of the annual meeting in 2003 is to be determined.

136. ESCAP will facilitate under the Dialogue Forum for Regional Initiatives for Space Cooperation in Asia and the Pacific the development of a regional cooperative project among member States on a space-based disaster monitoring system involving a constellation of small satellites.

137. EAP.AP-Bangkok has initiated the monitoring of glacier lake outburst flooding in the Hindu Kush and the Himalayas, together with ICIMOD and relevant national agencies. The inventory of two countries (Nepal and Bhutan) has been completed in the first phase. Together with the National Institute of Aeronautics and Space (LAPAN) of Indonesia and the Malaysian Centre for Remote Sensing (MACRES), the preparation of a 1:250,000-scale GIS database on the islands of Borneo and Sumatra is at the final stage. The database will eventually be used to prepare fire-hazard maps and a forest fire danger-rating index.

138. Through EAP.AP-Bangkok and GRID-Sioux Falls, UNEP is cooperating with UNDP in a GIS remote sensing assessment of the Democratic People's Republic of Korea relating to agricultural relief and rehabilitation following recent disasters.

139. Starting in 1998, when forest fires and wildfires broke out at locations around the world, GRID-Geneva has been preparing a regularly updated web site, which links relevant information from existing sources on the World Wide Web such as ESA, NASA, NOAA and national meteorological agencies. The aim of the project is to summarize and disseminate available information on wildfires worldwide. Initially, when fire outbreaks were more frequent, bi-weekly reports were posted on the web site and special status reports provided to the Office for the Coordination of Humanitarian Affairs. The web site now provides a map interface to guide users to the latest information on fires worldwide.

140. Since mid-2000 GRID-Geneva has been providing technical support work for a UNDP/Emergency Response Division project on development of an environmental risk/vulnerability index, for use in the UNDP *World Development Report*. In carrying out the analysis, statistical socio-economic data are integrated with spatial data sets of four key natural disasters (cyclones, earthquakes, floods and volcanoes). A GIS approach is employed to extract and analyse spatial information, whereas a statistical analysis is used to formulate a model of "Global Risk and Vulnerability Index: Trends by Year" (GRAVITY).

141. UNHCR, as part of a project on environmental monitoring of refugee camps using high-resolution satellite images supported by the European Commission, has developed standards for use of satellite images for humanitarian activities, including the use of data from new very high resolution satellites, such as Ikonos, for refugee operations. Reports and recommendations are available at http://www.enviref.org

142. Formed in 1997, GIST is an inter-agency initiative that promotes the use of geographic data standards and GIS in support of humanitarian relief operations. GIST also identifies data resources to support preparedness and emergency response.

143. GIST members are technical experts and geographic information specialists from United Nations and donor agencies involved in disaster management and/or humanitarian assistance. The Office for the Coordination of Humanitarian Affairs of the Secretariat acts as the GIST secretariat. The following institutions were GIST members in 2001: Office for the Coordination of Humanitarian Affairs, UNHCR, World Food Programme (WFP), FAO, UNICEF, the World Bank, the Office of Federal Disaster Assistance (OFDA) of USAID and the European Commission Joint Research Centre. The Department of Peacekeeping Operations of the Secretariat and WHO are new members.

144. GIST is based on the premise that common approaches to organizing and sharing information will improve information exchange and strengthen the ability of the humanitarian community to coordinate emergency response. To that end, GIST has led the development of common information and data standards for humanitarian emergencies, the largest of which is known as Structured Humanitarian Assistance Reporting (SHARE). The concept aims to create a common approach to organizing information so that it can be pooled, analysed and mapped.

145. For example, during GIST's pilot effort in Kosovo, members were able to implement SHARE standards during the early stages of the emergency so that data could be shared easily throughout the relief operation. GIST members encouraged the use of common location codes (P-codes) to compile sectoral information into databases and to compare that information easily against other baseline data, such as comparing locations of mines with the locations of schools and clinics.

146. As part of an inter-agency response to the flooding in Mozambique in early 2001, GIS specialists from WFP, the Office for the Coordination of Humanitarian Affairs, USAID/OFDA and the World Bank developed a common, comprehensive alpha-numeric list of location codes and designed maps comparing needs with relief activities so that helicopters could pinpoint where critical needs were going unmet.

147. GIST is currently involved in the Afghan crisis and will continue to work to support humanitarian activities through the Humanitarian Information Centre for Afghanistan. GIST is also involved in Eritrea and Sierra Leone, where the Sierra Leone Information Center has been established to reinforce information management among the humanitarian organizations. GIST is also closely collaborating with the Data Exchange Platform for the Horn of Africa.

148. Within GIST, UNHCR, in close collaboration with the Office for the Coordination of Humanitarian Affairs, UNICEF, FAO and WFP, is currently undertaking a survey on how satellite images are used by United Nations humanitarian agencies. GIST has developed a web site dedicated to supplying humanitarian relief organizations with geographical data (http://gist.itos.uga.edu), including free Landsat-7 imagery of selected areas.

149. UNHCR is currently finalizing a technical document on how satellite imagery is used or can be used in connection with refugee operations. The guidelines are intended to be practical and user-friendly in order to ensure that decision makers and other non-technical UNHCR staff can easily understand the benefit of using remote sensing products in their operations. UNHCR will also continue to coordinate the use of satellite imagery, such as free sharing of Landsat-7 data, within GIST.

150. UNHCR has been a key member of the Global Disaster Information Network (GDIN) since its launch in 1998 and together with UNICEF leads workshops on standards for GIS and satellite images. The Network is a forum where satellite data providers, value-added service industries, software providers and representatives of disaster relief organizations are introduced to the latest updates and can develop links for information-sharing with the aim of providing more efficient services to the disaster relief community.

151. In close collaboration with its field offices, UNHCR is continuing to expand the use of GIS and remote sensing technologies in its operations. In 2002 it is expected to have regional geographic information coordinators in the UNHCR regional offices for the West African and Southern African regions. Systematic collection of GPS coordinates of all UNHCR offices and refugee camps around the world is made on a systematic basis and is recorded into a standardized database. The database is continuously updated according to the evolution of refugee situations.

152. UNHCR is testing and evaluating the new generation of commercial satellites with very high resolution capabilities, such as Ikonos and Quickbird, in such fields as environmental assessment, camp planning and staff security.

153. UNHCR is continuing to provide basic training in terms of GPS, GIS, satellite imagery and map-reading to humanitarian emergency personnel from the United Nations, non-governmental organizations and some donors, via its workshops on emergency management. During the course of 2002 and 2003, awareness-raising assistance on the use of geographic information and tools related to it will be given to desk officers and senior staff to increase the use of such technologies in refugee operations.

154. UNHCR will develop lessons learned regarding the use of geographic information and related technology in the context of the Afghan crisis.

155. In 2002, UNHCR will collaborate with the Office for Outer Space Affairs to develop specific field applications using satellite imagery and other geographic information technologies in refugee operations, in particular in the field of staff security and reintegration projects in Asia and Africa.

156. In June 2001 ITU/BDT published in the three official languages (English, French and Spanish) a disaster communication handbook for the benefit of the developing countries. The book was developed in line with the 1998 Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations and in application of resolution 644 of the 1997 ITU World Radiocommunication Conference and resolution 19 of the 1998 ITU World Telecommunication Development Conference.

157. In the framework of the Geological Applications of Remote Sensing (GARS)-Asia project, a regional workshop will be held in 2002-2003 on the use of radar imagery and GIS technology for volcanic hazard assessment and prediction and earthquake and landslide monitoring.

158. Based on the outcome of the GARS research activities on natural hazards, UNESCO, together with ICSU, ESA and other IGOS partners, has proposed to develop a geological-geophysical hazards theme that will focus on earthquakes, volcanoes and landslides. The goal of the proposal is to design a common strategy to meet ground-based and space-based observational needs for operational and research activities in those areas. An international workshop will be held in March 2002 in Frascati, Italy, to prepare the theme proposal.

159. In late 1999, UNESCO started implementing a four-year project funded by the Government of the Netherlands aimed at strengthening the capacity of Central American countries to mitigate the effects of natural disasters. Activities include training and hands-on experience in geo-hazard zonation and vulnerability assessment and risk mapping using GIS technology. UNESCO cooperates closely with the Centre for Coordination of the Prevention of Natural Disasters in Central America (CEPREDENAC) and with ITC, Delft Technical University and the University of Utrecht, as well as with the GeoForschungsZentrum Potsdam of Germany and the Bureau de recherches géologiques et minières of France. A similar project is being initiated in Asia with partners in India.

160. UNESCO continues to cooperate with the Council of Europe, the European Commission and ESA in implementing the Space Techniques for Major Risk Management (STRIM) programmes.

161. UNESCO will promote the establishment of the Brazilian satellite-based environmental data collection and analysis system in Africa for the mitigation of climate-related natural disasters. The initiative aims to strengthen South-South cooperation and technology transfer and will demonstrate the vital role played by scientific data transmission via satellite in environmental monitoring and management.

162. UNESCO cooperates with the Council of Europe, within the framework of the Council of Europe Open Partial Agreement on the Prevention of, Protection against and Organization of Relief in Major Natural and Technological Disasters, in carrying out research studies on the use of space technology in disaster management.

163. UNESCO will continue to support training courses on remote sensing and GIS technologies in applied geomorphology and risk management organized by the Aerospace Remote Sensing Development Group in Toulouse, France.

164. Major WMO global data-processing and forecasting centres operated by WMO members within the framework of the World Weather Watch and equipped with supercomputers and/or clusters of high-speed computing parallel processors depend critically on satellite-based observing systems. Such systems form a major part of all observational monitoring, data analysis and processing to establish the state of the atmosphere and ocean environment, with a view to predicting and forecasting very short-range watches and warnings and short-range forecasts and medium-range guidance for severe weather events such as hurricanes and other tropical storms, tornadoes and severe thunderstorms, aviation hazards, marine hazards and long-range predictions of weather and climate extremes up to seasonal and inter-annual time scales. WMO operates active programmes on tropical cyclone warning and forecasting with specialized

meteorological centres and relevant national meteorological services covering most cyclone-active ocean basins. Likewise, WMO has implemented operational emergency response activities on the provision of transport model products for environmental emergency response activated in the event of nuclear emergencies, volcanic eruptions, forest fires, major chemical incidents or other relevant industrial incidents. Those warnings and forecast products are made available by national meteorological and hydrological services to relevant state agencies, disaster managers at various national levels and the general public for disaster mitigation and management. The prediction skill of such products is equally critically dependent on the input of satellite remotely sensed observations into prediction models.

165. The WMO proposals for satellite-related events for the biennium 2002-2003 include two training workshops on hurricane forecasting and warning, to be held in Miami, Florida, United States, in 2002 and 2003, a training course on tropical cyclones to be held at the Regional Specialized Meteorological Centre on the island of Réunion, France, in 2003 and the Southern Hemisphere Training Course on Tropical Cyclones to be held in Melbourne, Australia, in 2002, with emphasis on small island developing States and the southern hemisphere.

166. Upgraded satellite-based telecommunication systems in the South Pacific States should further improve the tropical cyclone warning capabilities of the members in the region in cooperation with Regional Association V (South-West Pacific).

167. With support from the WMO World Weather Watch, the WMO Commission for Aeronautical Meteorology, in collaboration with ICAO, is actively involved in the implementation of the World Area Forecast System (WAFS), which uses satellite-based communication systems to distribute aeronautical meteorological forecasts in support of commercial aviation (as part of the ICAO aeronautical fixed service). The World Area Forecast Centre (WAFC) in London transmits WAFS products via the satellite distribution system for information related to air navigation (SADIS) to Africa, Europe and Western Asia and the WAFC in Washington, D.C, transmits its products to the rest of the world, using two international satellite communications systems (ISCS). The current ISCS contract would expire at the end of September 2003 and the system would be upgraded to increase bandwidth and data-handling capabilities.

168. Many countries receive the United States Emergency Managers' Weather Information Network (EMWIN) broadcasts, via the GOES-10 satellite to obtain real-time information providing minimum United States aviation model information and some meteorological bulletins retrieved from the WMO global telecommunication system. In anticipation of the replacement of the current satellite used by EMWIN, the needs for WAFS information in the South-West Pacific region should be addressed, as only a few countries have access to ISCS broadcasts.

169. One of the techniques for distinguishing an ash "cloud" from water/ice cloud is the use of infrared channels 4-5 split-window techniques, which will not be available in the next series of United States GOES satellites. However, it is expected that the METEOSAT second generation will have more channels available to detect volcanic ash.

170. In cooperation with IMO and IOC, WMO maintains and continues to upgrade internationally coordinated agreements, procedures, protocols and facilities, especially software, for the dissemination of meteorological and oceanographic data and information to ships at sea and for the collection of data from those ships, using the Inmarsat satellite system, in particular the Inmarsat-C facility. The WMO marine broadcast system, which is globally coordinated under the Global Maritime Distress and Safety System (GMDSS), became fully operational in 1999.

2. Enhancing economic, social and cultural security

171. In 2002, the Office for Outer Space Affairs will continue to provide technical assistance to UNDCP in using images from civilian satellites to monitor illicit crop cultivation and support alternative development projects. Such technical assistance will include technical backstopping of ongoing projects including the implementation of a land use management system for the area of Yungas de La Paz in Bolivia and also the development of specific methodological approaches for the survey of opium poppy in Myanmar and possibly in Afghanistan.

172. In 2002 and 2003, ECA will carry out a series of technical studies, including those listed below, which will deal with remote sensing and GIS:

(a) A study on the establishment of regional and national geographic information infrastructures in Africa;

(b) A technical background document on the African Information Society Initiative.

173. ECA will continue to consolidate the contents of the database on geo-information in Africa, which includes GIS applications, mapping coverage and educational training facilities.

174. Following the first African Development Forum, ECA has developed three major proposals to enhance socio-economic conditions of the African population. These are:

(a) *Pan African electronic (e)-commerce initiative*. The e-commerce proposal examines the range of tele-services and products and their markets with a view to identifying niche products and services for African small business. It analyses the policy environment needed to nurture e-commerce in the small business sector and examines the feasibility of a regional mechanism. The project promotes information-sharing and capacity-building in line with the recommendations of the first African Development Forum. In collaboration with the International Development Research Centre of Canada, ECA has developed a business plan aimed at putting in place desirable policy, regulatory, legal and other enabling conditions in selected African countries to stimulate private sector investment in e-commerce;

(b) *Health and information and communication technologies project*. The project identifies opportunities such as telemedicine, national health record databases and use of information and communication technologies in health systems and their potential impact on the population and proposes a strategy and action plan. The strategy identifies actions at the national, subregional and regional levels and the entry points for South-South and North-South collaboration and proposes a phased implementation approach through pilot projects, surveys, evaluation, extension and ownership. It will target specific recommendations to Governments, the private sector, development agencies, non-governmental organizations and the diaspora;

(c) *SchoolNet Africa project*. The project supports the development of a regional framework—to be largely online—to build political awareness, secure resources, to promote collaborative projects among students and teachers, to ensure that best practices are identified speedily and to promote the sharing of information and experience. The business plan being developed will identify a legal structure and specific functions to be carried out by regional entities and supported under the project. The potential benefits of SchoolNet are enhanced learning opportunities for students, teachers and the community. Support to school networking organizations will strengthen the link between the various stakeholders and bridge the gap between policy and implementation to enhance knowledge-sharing and acquisition.

175. When resources become available, ESCAP will develop and implement regional cooperative projects within the framework of RESAP II on space technology applications for social development, including projects on telemedicine for rural populations, and on environmental monitoring and analysis for health care and hygiene.

176. Through GRID-Geneva, UNEP maintains up-to-date databases of human population density and distribution for Asia and the Russian Federation. The data sets were developed using GIS modelling techniques and the most recent data available on sub-national administrative boundaries and human population at the third (district) administrative level. The GIS model is based on an "accessibility index" and the tendency of people to cluster near existing centres of population and along the transportation infrastructure. The final gridded GIS data sets can be used for a wide variety of applications, including assessment of human impacts on the environment, agriculture and poverty mapping. The report and results of the project are available on the web (http://www.grid.unep.ch). UNEP will also continue its efforts to complete comprehensive and globally consistent data sets relating to global land cover, digital elevation, drainage basins, population and forest vegetation in cooperation with agencies around the world.

177. Through EAP.AP-Bangkok and with financial assistance from the Asian Development Bank, UNEP prepared a 1:1,000,000-scale database of the entire Greater Mekong subregion and a 1:250,000-scale database for the five selected hot spot areas in the same

subregion, which is being used to prepare the strategic environmental framework for the Greater Mekong subregion. The databases consist of both biophysical and socio-economic information. EAP.AP-Bangkok has developed a GIS-based early warning system for the Greater Mekong subregion from the environmental perspective, which is suitable for use in transportation and hydropower planning. It is planned to develop the system further with additional data layers.

178. UNESCO and UNDP are implementing the sustainable development of the South Valley and Sinai programme using remote sensing and GIS technologies, in cooperation with the Geological Survey of Egypt and the Egyptian National Authority for Remote Sensing.

179. UNESCO and ESA presented to space agencies the open initiative on the use of space technology in monitoring World Heritage sites during the 52nd International Astronautical Congress, held in Toulouse, France, in October 2001, and invited agencies to participate in the initiative. The objective is to make satellite images available to signatory countries of the World Heritage Convention, in particular to the less developed countries where 300 of the 721 sites are located, in order to improve the monitoring and preservation of such sites. In the framework of the open initiative, UNESCO and ESA will start a pilot project in Central Africa in January 2002 oriented towards the use of satellite images to detect habitat changes at World Heritage sites hosting gorillas. The main areas to be monitored are the gorilla habitats in the Democratic Republic of the Congo and Uganda. The expected results are maps that show the changes that occurred at the gorilla habitats over the previous 10 years, which will then be used by field rangers to set up priorities for areas requiring improved protection.

180. On the occasion of the thirtieth anniversary of the World Heritage Convention as well as 30 years of satellite imagery in the public domain, a UNESCO/EURISY workshop on the use of remote sensing to monitor World Heritage sites will be held in Strasbourg, France (a World Heritage site), from 5 to 8 November 2002. Satellite images have been widely used to monitor natural sites (e.g. national parks and/or protected areas), and now, thanks to the availability of high-resolution images, it is feasible to use satellite images to monitor cultural sites (e.g. castles, churches, old cities, etc.). The workshop, co-sponsored by ESA and NASA, will bring together experts as well as end-users to discuss capacity-building and the benefits and associated costs of making use of space technology in monitoring World Heritage sites.

181. In the framework of its space archaeology programme, UNESCO will support the Earth observing seminar being organized by the Governments of Egypt and Japan in Cairo from 3 to 5 March 2002 and the EURISY workshop for Ph.D. students on remote sensing applied to archaeology to be held in Strasbourg, France, in late October/early November 2002.

182. UNESCO and ITU initiate pilot projects on education applications of interactive television, two of which will soon be carried out in Cape Verde and India. The projects, which support teaching of primary teachers in developing countries, consist of providing sound and visual images to "virtual" classrooms. The return path enables the viewer to communicate by voice and data channels with the broadcast site. While UNESCO is responsible for the conceptual aspects and educational content, ITU, which is developing the standards, takes primary responsibility for the technical implementation and choice of technological solutions.

183. The e-learning for blind people project of the UNESCO Division for Science Analysis and Policy was launched in December 2001 at the Noor Institute for the Blind in Doha in cooperation with the UNESCO Doha Office and the Arab Gulf Programme for United Nations Development Organizations. The project aims at creating a cyber multimedia space for people with special needs and at applying new teaching methods for training trainers and students at all educational levels using new information and communication technologies. The project's innovative concept is the "virtual classroom" with a graphic screen reader system in Braille in English, French, Spanish, Arabic, Hindi and Urdu languages. The project will also be implemented in several centres in Saudi Arabia, in cooperation with the Saudi Ministry of Education, as well as in 22 other Arab countries.

184. A similar project was initiated by the Division for Science Analysis and Policy in India on e-learning for the visually impaired and technology transfer, in cooperation with the UNESCO New Delhi Office and the Indian National Council for Education, Research and Training. The transfer of technology aspect

consists of replicating the Braille terminals in the region, which will cost five times lower than the normal price. This activity will be carried out in cooperation with India and Japan. The project will be extended to other countries of the region of Asia and the Pacific and steps are being taken to launch similar projects in the African and South American regions.

185. The Division for Science Analysis and Policy and the European Commission will launch, in the framework of the EURMEDIS programme, the AVICENNA "virtual campus" in 2002. The AVICENNA project is intended to create a Euro-Mediterranean network of 15 universities for open distance learning and to promote and encourage intercultural exchanges and cross-fertilization. The universities are located in the following countries: Algeria, Cyprus, Egypt, France, Italy, Jordan, Lebanon, Malta, Morocco, Palestine, Spain, Syrian Arab Republic, Tunisia, Turkey and the United Kingdom. Each participating country is known as an AVICENNA knowledge centre. The network organization will be supported by some of the leading open universities of countries of the European Union under the aegis of UNESCO.

186. UNESCO is carrying out a distance education network information project to assist the Libyan Arab Jamahiriya develop a national strategy and a long-term plan for the introduction of communication and information technologies in higher education and scientific research. The project will result in the establishment of a network for distance education linking all institutions of higher learning in the country.

187. UNESCO is providing technical expertise for the design and technical preparation of the project document on educational and technological aspects of the Arab Open University in cooperation with the Open University of the United Kingdom. The project supports the development strategy of the Arab Open University and a long-term plan for the introduction of new technologies in higher distance education in all branches.

188. A working group of the WMO Commission for Agricultural Meteorology is currently responsible for reviewing and summarizing the development of techniques and methods to obtain and manage ground-based and remotely sensed agro-meteorological and agronomic data in the most timely and efficient manner for applications to agriculture. In addition, the Commission for Climatology has increased its efforts in satellite climatology. The new expert team will investigate and recommend improved methods of using satellite data for global climate monitoring and climate prediction methods.

C. Utilizing and facilitating information and communication technology for development

189. The United Nations Information and Communication Technologies (ICT) Task Force, established by the Secretary-General at the request of the Economic and Social Council, was officially launched by the Secretary-General on 20 November 2001. The Task Force is positioned to draw on the unique advantages of the United Nations in building collaborative partnerships to lend a truly global dimension to the multitude of efforts to help bridge the global digital divide, foster digital opportunity and thus put ICT at the service of development for all. The Task Force consists of 18 high-level government representatives, 8 private sector leaders at chief executive officer level, 6 executive heads of United Nations agencies and leaders of 4 not-for-profit organizations. It represents a unique opportunity to establish the leadership role of the United Nations in this strategic area, to give new momentum to international efforts to bridge the digital divide and to address the underlying global policy issues.

190. One potentially significant area where the Task Force can promote the development impact of ICT is enhancing access and connectivity. In particular, the Task Force plans to look into the potential of using the currently underutilized capacities of low-Earth orbit (LEO) satellites for facilitating affordable access and connectivity for remote and underserved areas, in particular in the least developed countries. This would have immense development potential, in particular by allowing countries to "leapfrog" stages of technological and infrastructural development.

191. The Office for Outer Space Affairs, within the framework of the United Nations Programme on Space Applications, will continue to support the work of the Asia-Pacific Satellite Communications Council, which was established in 1994 with the assistance of the Programme and has now expanded to 90 members

from 31 countries. The Council has been playing a key role in promoting development of and cooperation in satellite communications in the region by providing a platform to exchange views and ideas on new technologies, systems, policies and satellite communication services. It organizes the Asia-Pacific Satellite Communication Conference and Exhibition for Global Communication on a biennial basis. The next conference will be held in 2002.

192. The Office for Outer Space Affairs maintains a web site dedicated to coordination of space activities in the United Nations system (www.uncosa.unvienna.org).

193. The Office for Outer Space Affairs has made available online, through the web site of the United Nations Programme on Space Applications, an updated directory on education, training, research and fellowship opportunities in space science and technology and its applications.

194. In partnership with African and international organizations, Governments, civil society, public and private sector stakeholders, ECA has started progressively integrating new information and communication technologies to strengthen its core roles as a convener of choice, hub of policy networks and advocate on issues of vital social and economic importance to Africa. In that regard, ECA will apply ICT to transform itself into a knowledge-based organization that enriches—and is enriched by—the intellectual and information resources that underpin development in all countries in the region. To fulfil its mission, ECA will amplify its convening power by using ICT to promote discourse prior to, during and following key meetings: (a) to package the content of key conferences and meetings in digital form for transmission over a broad range of media; (b) to supplement conferences by providing on-site training in the use of technologies to access information and engage in debate; (c) to facilitate access to training in areas where the ECA programme reveals gaps and needs; and (d) to support bridge-building between African institutions and the international development community.

195. In addition, ECA launched the Information Technology Centre for Africa project on the occasion of the first meeting of the African Development Forum, held in Addis Ababa in October 1999. The Information Technology Centre for Africa aims at raising the awareness of African policy and decision makers on the importance of building an information society in Africa and providing focused training for both policy makers and implementers on new information technologies. In 2002, the Centre will start its second training course on networking technology for African women (French-speaking countries), in collaboration with the Cisco Networking Academy Program and the World Bank Information for Development Program. The Centre has already started organizing tailored exhibitions related to the themes of major conferences and meetings at ECA and will soon serve as a year-round standard exhibition centre focusing on a demonstration of the general use of ICT and sector applications.

196. The first results of the Scan-ICT project will be released in mid-2002. The Scan-ICT study was launched in six pilot countries, Ethiopia, Ghana, Morocco, Mozambique, Senegal and Uganda, and aims at building support for the phased development of a comprehensive African capability to collect and manage key information, including indicators needed to support the growing investment in ICTs in Africa. The Scan-ICT partnership consists of the Acacia/International Development Research Center, Canada, the European Commission (DGVIII), the Norwegian Agency for International Development and ECA.

197. ECA will organize the third meeting of the Committee on Development Information, with subcommittees on information and communication technologies, statistics and geo-information, in Addis Ababa in March 2003. The Committee reports to the ECA Conference of Ministers responsible for economic development and planning.

198. In 2002 and 2003, ECA will continue to provide advisory services to its member States, subregional and regional institutions on the development of information and communication infrastructure, policies, plans and strategies.

199. When resources become available, ESCAP will develop and implement regional cooperative projects within the framework of RESAP II on applications of satellite communication for sustainable development at the national and regional levels, including a project on community-based communication facilities for rural development. The ESCAP Regional Working Group on Space Science and Technology Applications will undertake under RESAP II the common denominator

project on low-cost infrastructure for high-speed Internet access in rural areas.

200. ESCAP will facilitate under the Dialogue Forum the development and implementation of a regional cooperative project among member States on a cooperative distance education system.

201. ESCAP will conduct a study on a policy framework for operational integration into the "information superhighway" of satellite-based Earth observation and communications for sustainable development, develop a study on the framework of an association of regional space industries to support sustainable development and contribute to research and demonstration activities on the use and potential of high data rate communication satellites in community-based teleservice centres.

202. ESCAP will hold the annual meeting of the Regional Working Group on Satellite Communication Applications in Bangkok in 2002. The venue of the annual meeting in 2003 is to be determined.

203. A study implemented by the ESCWA Technology Section during 2001 examined the capabilities of ESCWA member States in accessing modern telecommunications systems, touching upon specific space-based technologies. Issues in that area will be taken up in 2002 with a substantive study and a meeting on ICT strategies and measures for ICT capacity-building.

204. The space-based telecommunications of UNEP.Net and Mercure provided invaluable support to and enhanced the cost-effectiveness of the operations of UNEP as a United Nations entity. One area in which this has been evident is videoconferencing. UNEP.Net/Mercure supported digital telephone services of the integrated services digital network for all United Nations entities located at the Gigiri campus in Nairobi. As a result, videoconference services from the desktop have been feasible. Such services not only reduced the need for missions but also facilitated regular brief interactions, such as participation by the Executive Director in weekly high-level management sessions with his peers. Similar videoconference services were implemented at some UNEP regional and outposted offices on six continents. UNEP.Net/Mercure satellite services also provided a number of services that reduce the telecommunications costs of UNEP. Particular areas of interest are Internet-based services for telephony and fax.

205. UNEP, through GRID-Sioux Falls, will continue to disseminate information related to the latest developments in information technology, including remote sensing, GIS data management and applications and Internet technologies. Through GRID-Sioux Falls, UNEP is also pioneering the use of interactive Internet map server (IMS) technology in the United Nations system that would allow users to specify data and the scale of maps, in cooperation with ESRI. In that connection, UNEP, through GRID-Sioux Falls, has completed the global energy and water cycle project with advanced Internet data access capability and has implemented a clearinghouse node for UNEP data that complies with the standards of the International Organization for Standardization/Federal Geographic Data Committee of USGS.

206. In 2002, UNEP will strive to make more of its published and database materials available on the Internet and the World Wide Web. Over one million freely available files have been transferred over the past years from the award-winning Internet site of GRID-Sioux Falls. UNEP will continue to promote such access to important data and information.

207. In the light of technological development, ITU radiocommunication study groups 1, 3, 4, 6, 7 and 8 are pursuing studies on technology and spectrum/orbit utilization for space communications. The radiocommunication study groups are part of the ITU Radiocommunication Sector (ITU-R), which is responsible for studying technical, operational and regulatory/procedural questions on radiocommunication, issuing recommendations and preparing the technical basis for radiocommunication assemblies and world radiocommunication conferences. In particular, ITU-R has established standards for the detailed specifications of the radio interfaces of International Mobile Telecommunication-2000, the satellite component of which is comprised of six different interfaces.

208. BDT has been studying technical, operational and tariff questions and adopting recommendations on them with a view to standardizing telecommunications on a worldwide basis. The priority for the Bureau to establish standards for the implementation of the global information infrastructure and global multimedia mobility. The Bureau will continue its studies in the application of space technology in different

services, such as aeronautical, maritime and land mobile telecommunication services to remote regions and for weather forecasts. The Bureau will also continue to ensure the full integration of the satellite transmission medium in worldwide telecommunication networks.

209. The intersectoral groups of ITU-R and BDT ensure that studies carried out in the two sectors are conducted in a harmonized way, avoiding any possible overlapping and dispersion of efforts. The intersectoral group on satellite matters reviews the recommendations of the two sectors in order to ensure the full integration of the satellite transmission medium in the telecommunication networks, taking into account emerging technology, applications and services.

210. BDT is now implementing the Valletta Action Plan adopted by the Second World Telecommunication Development Conference in May 1998. The Valletta Action Plan includes the following chapters: chapter I on the programme of cooperation among the members in the telecommunication development sector; chapter II on the Valletta Action Plan programmes; and chapter III on the special programme for least developed countries (see A/AC.105/726, para. 174 (d)).

211. ITU will organize periodic world telecommunication policy forums to discuss and exchange views and information on broad telecommunication policy issues, technological advances, infrastructure development and financial business considerations. The Third World Telecommunication Policy Forum was held in Geneva from 7 to 9 March 2001 and participants considered issues relating to Internet protocol telephony. Several opinions were adopted similar to that adopted by the first World Telecommunication Policy Forum with regard to promotion and introduction of global mobile personal communications by satellite. A specific opinion was adopted dealing with promotion of the introduction of Internet protocol telephony in developing countries.

212. A World Summit on the Information Society is being organized within the United Nations system. ITU is taking the lead role in organizing the summit in cooperation with other interested United Nations entities. The first phase of the World Summit will be in Geneva in December 2003, hosted by the Government of Switzerland, with a second phase in Tunis in 2005, hosted by the Government of Tunisia. The focus will be on bridging the digital divide and will include consideration of the means of service delivery and applications covering relevant developmental, economic, policy, social, cultural and technological aspects.

213. ITU organizes world telecommunication exhibitions and forums (TELECOM) in Geneva every four years, as well as similar four-year rotational regional events in Africa, the Americas and Asia. The next World TELECOM will be held in Geneva in 2003. Problems related to the ever-increasing uses of outer space, such as communication satellites, remote sensing and navigational services, as well as direct satellite broadcasting to rural and underdeveloped areas of the world, are some of the main issues of concern and discussion at such forums.

214. ITU holds world radiocommunication conferences every two to three years. The purpose of the conferences is to update the international radio regulatory process and prepare for future requirements. The World Radio Conference 2000, held in Istanbul, Turkey, from 8 May to 2 June 2000, established a number of new arrangements for technical and regulatory aspects of communication using geostationary and non-geostationary satellites for various services, such as mobile satellites, Earth-exploration satellites, space research satellites, meteorological satellites and broadcasting satellites. The Conference also adopted a new plan for broadcasting satellite services for countries in regions 1 and 3. The plan increases the channel capacity for countries in those regions and a mechanism for adding or modifying the agreed assignments. The next world radiocommunication conference is scheduled for 9 June to 4 July 2003 in Caracas, with an extensive agenda, including a number of issues relating to space services.

215. The Conference Preparatory Meeting, which has been established to carry out the necessary preparatory work for world radiocommunication conferences, will continue its work. The ITU-R study groups are conducting studies in the field of space radiocommunications concerning technical aspects of mobile-satellite, fixed-satellite, Earth-exploration-satellite, meteorological-satellite, space-research, space-operation and broadcasting-satellite services and LEO satellite systems. The Conference Preparatory Meeting will meet in Geneva from 18 to 29 November 2002 to prepare a report to the World

Radiocommunication Conference 2003 to assist members of ITU who will be involved in the deliberations of the 2003 Conference. During the first meeting of the Conference Preparatory Meeting immediately following the 2000 Conference, the members of the study groups, working parties, task groups, joint rapporteur groups and joint task groups of ITU-R were entrusted with the responsibility of preparing the studies requested by the 2000 Conference ahead of the 2003 Conference.

216. Pursuant to the requirements of a resolution passed at the World Radiocommunication Conference 2000, the ITU Radiocommunication Bureau (ITU-BR) and BDT will assist regional telecommunication organizations in their preparations for the World Radiocommunication Conference 2003. This assistance will include regional and interregional information meetings and both formal and informal meetings aimed at improving understanding of the issues and a convergence of interregional views on major issues.

217. Following the 1994 call by the ITU Plenipotentiary Conference, in its resolution 18, for a new in-depth review of the ITU spectrum/orbit resource allocation, the World Radiocommunication Conference 1997 decided to implement a number of measures to increase efficiency and equity in spectrum/orbit utilization. The practical implementation of those measures was considered by the World Radiocommunication Conference 2000 and will be reviewed again by the World Radiocommunication Conference 2003.

218. With a view to providing technical assistance to the participating countries, ITU-BR organizes world seminars every two years and regional seminars in the intervening years on frequency management, the use of the geostationary orbit and preparatory activities for the radiocommunication conferences. The next such world seminar will be in November 2002 in Geneva.

219. BDT conducts, within the Valletta Action Plan for global telecommunications development, round tables and seminars on telecommunication policies, strategies, research and development for developing countries, training of staff from developing countries in various areas of telecommunications, use of the Global Maritime Distress and Safety System and mobile satellite communications, in particular global mobile personal communications by satellite. The Bureau also promotes applications of new technologies for the development of telecommunication services in developing countries, especially for rural and isolated areas, through the implementation of pilot projects.

220. In line with the recommendation of the Second World Telecommunication Development Conference, in 1998, BDT launched a new programme in 2001 for the promotion and development of universal access in Africa using satellite technologies. The BDT initiative is supported by both the International Telecommunications Satellite Organization (Intelsat) and EUTELSAT, which have signed separate memorandums of understanding to that effect with BDT, in October 1999 and May 2000, respectively. Some 16 projects are under consideration and corresponding feasibility studies are being conducted by ITU, Intelsat and EUTELSAT experts.

221. ITU is implementing five projects for the establishment of centres of excellence in telecommunications: two in Africa, one in Asia, one in the Americas and one in the Arab region. The centres are playing an important role in strengthening competencies in the field of telecommunications by training top-level managers and government authorities in the areas of policies, regulation, management (including frequency management) and technologies and services.

222. At the request of administrations of member States that are developing countries, BDT will continue to provide experts to participate in satellite Earth station projects and in the planning of regional or domestic satellite communication systems. Documents prepared by the Bureau, such as the telecommunication development plans, master plans or sectoral studies, usually include a satellite component.

223. Administrations of member States will continue to be kept informed on a regular basis, through the fortnightly information circulars of ITU-BR and the special sections annexed thereto, now published on CD-ROM, of the basic technical characteristics, frequency assignments and orbital positions of space systems communicated to the Bureau. That information is also made available on the Internet.

224. ITU-BR periodically publishes approved recommendations, either new or revised, on space radiocommunications. Publications of special interest for space radiocommunications concern issues on space applications; fixed-satellite, mobile-satellite, radio-determination-satellite, amateur-satellite and

broadcasting-satellite (sound and television) services; satellite news gathering; frequency sharing; and compatibility of different services. They form the basis for harmonious technical development of space radiocommunication systems and contain criteria for the sharing of frequency bands between the various space services, as well as between space and terrestrial systems.

225. On a quarterly basis, ITU-BR publishes an updated list, known as the Space Network List, of orbital positions and associated frequency bands of space stations on board geostationary satellites and non-geostationary space systems. The Space Network List is now also available online. In more detailed form, the Bureau publishes, on CD-ROM, all the technical characteristics of satellite networks submitted to it under the coordination or notification procedures, for recording in the Master International Frequency Register. The information is also available on the Internet.

226. In 2000, in collaboration with operators and industry providing global mobile personal communications by satellite, BDT published a reference book compiling basic technical, operational, regulatory and socio-economic information related to the introduction of related technology and services in the world in general and in developing countries in particular. This is part of the Bureau's assistance to developing countries in apprehending and optimizing the use of and benefits from global mobile personal communications by satellite, which are the latest space telecommunication application technology.

227. UNESCO will continue to examine different ways and means of wider usage of low- and geostationary orbit satellite systems for communication, information, informatics, education, science, culture and environmental protection in its programmes, such as the International Commission on Education for the Twenty-first Century. As part of the programme, UNESCO assesses, evaluates and studies the experience achieved in distance education as well as the impact of new communication and information technologies, in particular communication satellites useful for distance education.

228. UNESCO participates in the Trans-European Tele-education Network initiated by the European Commission and aimed at creating a European distance training network. UNESCO cooperates with the Czech Republic, Hungary, Lithuania and Poland.

229. Information and communication technologies for development represent a major programme area of UNESCO and represent a priority cross-cutting theme for the biennium 2002-2003. In the information and informatics area, promoted through the UNESCO intergovernmental Information for All programme, satellite links will continue to be stressed where they are feasible and cost-effective for developing country institutions, for example, to support activities in areas such as national public service telematics networks, distance education, virtual laboratories, digital libraries and community telecentres and multimedia centres. The largest demand is expected to be for video-based distance learning facilities in higher education, in particular teacher training.

230. In the wake of the Global Knowledge Partnership Action Summit, held in Kuala Lumpur in March 2000, UNESCO launched a new programme for community multimedia centres, implemented in close cooperation with ITU, which aims to integrate traditional and new communication technologies, in particular community radio, with telecentre activities at the community level. That effort is intended to complement the longer-standing UNESCO activities in support of community-owned and managed multipurpose community telecentres, which can be installed in public areas, including schools, libraries, community centres or post offices to provide a range of ICT support (telephone, fax, Internet, photocopy, computers, etc.) with associated training support for both development activities and individual users. In that context, new initiatives are being taken to promote access to communication channels at the community level involving the use of space technology.

231. Interactive television distance learning via very small aperture terminal (VSAT) pilot projects for primary teachers in India and Morocco were jointly set up and are in the process of implementation by UNESCO and ITU/BDT.

232. Within the framework of a project in the Niger in which UNESCO is participating together with UNDP, the African Centre of Meteorological Applications for Development and several other partners, the WorldSpace Foundation has provided the opportunity to use its multimedia channel, the Africa Learning Channel, free of charge in order to deliver contents to a

national network of community radios and community multimedia centres, which are also making use of WorldSpace audio channels for programme reception. The network will expand to 150 villages and will integrate information centre facilities, including multimedia facilities, with the radio stations. In another project being initiated for refugees from Burundi in the United Republic of Tanzania, ITU, UNHCR and UNESCO are supporting the development of multi-purpose community telecentres in the Lukole refugee camps, making use of WorldSpace content, the LEO electronic mail (e-mail) system of Volunteers in Technical Assistance and VSAT facilities.

233. UNESCO will continue to promote, through its microbial resources centres (MIRCENs), activities in bioinformatics, such as the Biotechnology Information Exchange System in Slovenia, the World Data Centre MIRCEN in Japan and a series of conferences conducted by the MIRCEN in Sweden. Through the MIRCENs UNESCO will also support research workshops and training in gene sequencing and gene database development for use in environmental management and human welfare in space capsules and life-sustaining systems in orbit.

D. Using and improving satellite positioning and location capabilities

234. In 2002, the United Nations Programme on Space Applications will organize two regional workshops on the use of global navigation satellite systems (GNSS), with funding provided by the United States Government in Chile for the benefit of the countries of the ECLAC region and in Zambia for the benefit of the countries of the ECA and ESCWA regions. Two similar regional workshops were organized in 2001 in Malaysia for the benefit of countries of the ESCAP region and in Vienna for the Eastern European countries. Findings and recommendations will be reviewed for follow-up action by a group of experts to include policy makers, manufacturers, service providers and users, as well as representatives of relevant international and regional organizations, at an international meeting to be held in Vienna in late 2002.

235. ICAO has developed standards and recommended practices for GNSS, which include provisions for ground- and satellite-based augmentation systems for GPS and GLONASS, to improve their overall availability, integrity and accuracy for aeronautical applications. Work is also under way to develop ICAO standards for GNSS enhancements such as GPS L5, an additional civil frequency for GPS, standards for aeronautical applications of Galileo and enhancements to GLONASS.

236. ITU-R is continuing its technical studies related to the use of GNSS and for the efficient use of associated radiofrequency spectrum and ICAO and ITU are continuing cooperation to protect aeronautical applications of satellite-based communication, navigation and surveillance systems. At the World Radiocommunications Conference 2000, spectrum was allocated for additional GNSS applications, including aeronautical applications.

237. ICAO and IMO are continuing coordination and exchange of information on various aspects of GNSS development and implementation. ICAO contributed to the formulation of a maritime policy on GNSS, which was approved by the IMO Assembly. Both organizations continue to follow a coordinated approach in supporting the evolution of GNSS towards a future system capable of supporting advanced applications for aeronautical and maritime navigation.

238. Recognizing the limitations of the present air navigation systems and the need to meet future requirements, ICAO has taken steps to promote the introduction of, inter alia, satellite-based technologies for communication, navigation and surveillance (CNS) elements in support of global air traffic management (ATM). The systems are an integration of terrestrial and space elements that will fulfil future international civil aviation requirements well into the present century. A fundamental prerequisite for the implementation of the systems on a global basis includes the development of uniform standards and recommended practices. Several panels of experts are involved in the activities under the responsibility of the ICAO Air Navigation Commission. With respect to space-related elements of the CNS/ATM systems, standards and recommended practices and guidance material have been completed for the aeronautical mobile-satellite service. Furthermore, a general technical framework governing the potential future use of commercial satellite systems for the provision of aeronautical safety services has been developed. Standards and recommended practices for air traffic service applications, including automatic dependent

surveillance systems and procedures, which are supported largely by satellite communications, have been developed. Provisions for the emergency locator transmitter, based on the COSPAS-SARSAT programme, have been reviewed, and amended standards and recommended practices have been completed. The planning and implementation of the CNS/ATM systems of ICAO are facilitated by a global plan and the activities of regional planning and implementation groups.

239. ICAO is conducting activities to face new challenges concerning human resources involved in the introduction of advanced satellite-based CNS/ATM. ICAO addresses human resource planning and training issues through its TRAINAIR programme, which provides a mechanism for cooperation among training centres for the development of the many new training courses that are required to support the introduction of CNS/ATM. ICAO will continue to organize seminars and workshops on the implementation of GNSS-based aeronautical systems and procedures.

240. At its thirty-second session, in 1998, the ICAO Assembly adopted the Charter on the Rights and Obligations of States relating to GNSS Services (resolution A32-19), which embodies fundamental principles applicable to GNSS. An ICAO secretariat study group was established to consider, inter alia, the creation of an appropriate long-term legal framework to govern the operation of GNSS. At its thirty-third session, in 2001, the ICAO Assembly decided that further work should be carried out in that respect.

E. Building capacity for space applications for sustainable development and enhancing education

241. World Space Week (4-10 October) is an annual observance established by the General Assembly in its resolution 54/68. It aims to raise awareness about space among the general public, in particular children, about the many ways in which space science and technology can support sustainable economic and social development. At least 30 countries participated in World Space Week 2001, under the theme "Inspiration from space". The Office for Outer Space Affairs is the focal point for World Space Week within the United Nations system and welcomes cooperation with other United Nations organizations that wish to participate in or organize related events.

242. The Office for Outer Space Affairs will provide technical advice to the Government of Colombia in organizing the Fourth Space Conference of the Americas, to be held in Cartagena, Colombia, from 13 to 17 May 2002.

243. Within the framework of the United Nations Programme on Space Applications, the Office for Outer Space Affairs will organize workshops and symposiums in 2002 and 2003 on data analysis, participation of youth in space activities, small satellites and other applications or policy-related themes. The Office will also organize workshops and training courses to build the capacity of developing countries and countries with economies in transition in the fields of remote sensing and its applications. A list of those activities is contained in annex I to the present report.

244. In 2002 and 2003, the United Nations Programme on Space Applications will continue to provide technical and financial support to the regional centres for space science and technology education affiliated with the United Nations, in particular in organizing their educational and training activities. The regional centre in Asia and the Pacific, which was inaugurated in India in 1995, offers postgraduate-level courses in the fields of remote sensing and GIS; satellite communications; satellite meteorology and global climate; and space and atmospheric sciences. The two regional centres in Africa, one for education and training in the French language in Morocco and one for the English language in Nigeria, were inaugurated in April 1998 and now offer nine-month programmes in satellite communications; remote sensing and GIS; and satellite meteorology. The inauguration of the regional centre in Latin America and the Caribbean, hosted by Brazil and Mexico, is expected to take place in 2002, in Brazil and Mexico. It is planned that the first course for the Brazil campus will start in February 2003 and the first course for the Mexico campus in August 2003. The inauguration of the centre in Western Asia, to be established in Jordan, is also expected to take place in 2002. The Programme will continue to provide assistance to the Network of Space Science and Technology Education and Research Institutions of Central-eastern and South-eastern Europe.

245. In 2002 and 2003, the Office for Outer Space Affairs, through the United Nations Programme on

Space Applications, will provide assistance to the regional centres for space science and technology education and the Network by further promoting awareness of the importance of their capacity-building efforts. The Office will bring the accomplishments of the centres and the Network to the awareness of the organizations of the United Nations system in order to promote their participation in the activities of the Centre and the possible establishment of partnerships among the centres, Network and the organizations.

246. In 2002, ECA plans to organize the following workshops and seminars for the benefit of its member States:

(a) An ad hoc expert group meeting on the establishment of regional and national geographic information infrastructures in Africa (Addis Ababa, dates to be determined);

(b) An ad hoc expert meeting on the African Information Society Initiative (Addis Ababa, dates to be determined);

(c) A symposium on geo-information awareness-raising and development of geographic information infrastructure (Addis Ababa, dates to be determined);

(d) A workshop on developing national information and communications infrastructure plans (Addis Ababa, dates to be determined);

(e) A workshop on new database development technologies and on organization and management of development information, including dissemination on the web and use of GIS in national statistical offices in Africa (Addis Ababa, November 2002);

(f) A subregional workshop on development of national information and communication infrastructure for Central African countries (dates and venue to be determined);

(g) A national workshop on development of national information and communication infrastructure for the Central African Republic.

247. ECA also plans to organize the following workshops in collaboration with the Regional Centre for Mapping of Resources for Development:

(a) A workshop on the use of remote sensing for land use and land degradation assessment and monitoring (Nairobi, June 2002);

(b) A workshop on the use of remote sensing data for assessment of geological and environmental resources (Nairobi, June 2002);

(c) A workshop on remote sensing and GIS technology for teachers and educators (August 2002);

(d) A workshop on the application of remote sensing and GIS to early warning systems for food security (Nairobi, September/October 2002);

(e) A workshop on geospatial database development and management for use in the planning process and decision support (Nairobi, October 2002).

248. The ECE Statistical Division will continue its activities on the integration of statistics and geography within the programme of work of the Conference of European Statisticians, a standing subsidiary body of ECE. Included in the programme of work for 2002-2003 are infrastructure requirements for geo-statistics, namely, the needs of statistical users, development of relevant data models, questions of data quality, infrastructure of spatial data, activating of statisticians as a user community and geo-located confidentiality problems. Cooperation between national statistical institutes and geo-data providers on pricing problems, copyright issues, updating issues connected to statistical databases and alternative sources of data (remote sensing) will also be studied. User support via spatial analysis and use case studies is the third group of issues that will be explored. Those and other questions will be discussed at the work session on methodological issues involving the integration of statistics and geography, to be organized in Geneva in early 2003. A one-day workshop devoted specifically to the problems of the European Union applicant countries will be organized jointly by ECE and the Statistical Office of the European Communities (Eurostat). Work will continue on the preparation of best practices in the use of mapping technologies and GIS for statistical purposes. These and other jointly prepared methodological materials will be available on the Internet at the following address: http://www.unece.org/stats/mapping

249. ESCAP will continue to organize regional workshops and seminars on space technology applications for environmental monitoring, natural resource management, natural disaster management, poverty alleviation, distance education and telemedicine in order to build national capacity in

using remote sensing and GIS and other space-related technologies to contribute to sustainable environmental and natural resource management and improved quality of life in the region of Asia and the Pacific.

250. ESCAP will continue to provide medium- and long-term fellowships in 2002 and 2003 for training on remote sensing and GIS for environment and natural resource management and sustainable development planning, satellite communication development and applications, in specialized educational institutions in the region of Asia and the Pacific.

251. ESCAP will continue to undertake technical advisory services on space technology applications for environment and natural resource management in its member States, upon the request of Governments.

252. Issues pertaining more or less directly to applications of outer space technologies are the subject of entries included in the *ESCWA Directory of Research Institutes*. The *Directory* is produced by the Technology Section of the Sectoral Issues and Policies Division and is aimed at facilitating coordination and cooperation in research and development activity in ESCWA member States. The second issue of the *Directory* will be issued in early 2002 and an updated third issue will appear in 2003.

253. In 2000, the UNEP Division of Early Warning and Assessment was restructured along functional lines to include an Environmental Assessment Branch and an Early Warning Branch. The Assessment Branch is responsible for the Programme's major environment assessments, such as the GEO report series, and other regional and thematic assessments. The Early Warning Branch includes the GRID and Infoterra networks and their functions, among those data and information management in support of assessment and regional capacity-building (the Environment and Natural Resources Information Networking (ENRIN) programme) at the institutional level.

254. UNEP capacity-building activities are restricted to those institutions which are active in expanding their data and information assessment network serviced by the GRID network and the ENRIN programme. UNEP network capacity-building and servicing activities are aimed, as appropriate, at identifying the needs of partner institutions, designing projects and formulating proposals to meet those needs and assisting the institutions in mobilizing resources to implement the projects. In return, UNEP seeks to enter into agreements on data access and exchange in the service of international assessment and reporting.

255. In Africa, UNEP continues to build networks and serve as a catalytic force for capacity-building. A dialogue is ongoing with the Intergovernmental Authority on Development on a network strategy for its member States.

256. UNEP maintains cooperation with SADC in the development of networks to support environmental and land management in the region. A joint SADC/UNEP initiative is aimed at strengthening national and subregional institutional capacities for environmental data and information management to support decision-making processes. The initiative comprises the following two components: SADC regional database development and networking, implemented by the SADC Food Security Technical and Administration Unit for the SADC Environment and Land Management Sector, and environmental information service training and education, providing SADC and its member States with the necessary support to establish and strengthen in-country environmental information service training and education infrastructure to meet the growing demand for skills in the specialized areas of environmental assessment and reporting, as well as environmental data and information management.

257. UNEP is working on a similar initiative for the subregional organization of the Permanent Interstate Committee for Drought Control in the Sahel (CILSS). In collaboration with AGRHYMET, UNEP drew up a regional environmental information service and networking implementation strategy, focusing on the following four strategic areas: institutional capacities; information exchange networks; harmonization and standardization of data and assessment and monitoring tools, including those for national and regional reporting on the state of the environment; and in-country training capacities. UNEP and its Environmental Information Services-Africa cooperate with countries in West Africa to develop guidelines for data standards and harmonization to facilitate the exchange and use of information within the region.

258. The Division of Early Warning and Assessment is also involved in the establishment of strategic alignments, partnerships and consultative mechanisms with key United Nations entities, international organizations, the scientific community and regional

and subregional centres of excellence involved in assessments of the environment and sustainable development processes, to improve their coherence and effectiveness.

259. One such activity concerns the development of a regional database, the Data Exchange Platform for the Horn of Africa, focusing on the Horn of Africa and serving more specifically as a foundation for improved analyses of inputs for the Africa Environment Outlook reporting process, the Earthwatch Decision Support System, applications for demonstration at the World Summit on Social Development, as well as valuable inputs in the development of a multi-agency pilot project for early warning and vulnerability assessments in collaboration with the United Nations Geographic Information Working Group.

260. It is envisaged that the planned activities of the Data Exchange Platform for the Horn of Africa will be based on a rigorous assessment of existing data needs, formalization of data-sharing protocols and common data management tasks, thereby reducing the duplication of effort and ad hoc data searches and allowing partners to focus on the analytical and operational functions of the processes of assessment and early warning. In addition, there will be a focus on enhancing timeliness, relevance, accuracy and availability of data.

261. EAP.AP-Bangkok will provide funding in 2002 for one person to study for a master's degree at the Asian Institute of Technology in Thailand and will offer two internships for the countries participating in a land cover project in 2002. EAP.AP-Bangkok has also initiated the capacity-building programme in countries of the Greater Mekong subregion with hardware/software support and short-term training on GIS, remote sensing and GPS technologies.

262. UNEP continues to develop data access agreements in Asia and the Pacific with cooperating institutions of the Association of South-East Asian Nations, the Mekong River Commission, ICIMOD, the South Asia Cooperative Environment Programme in Colombo and the South Pacific Regional Environment Programme, as well as with other small intergovernmental organizations. Regular meetings are held with the principal partners to ensure that agreements will take a complementary approach to capacity-building for assessment and reporting, including data management. Cooperation is continuing with the ESCAP Statistics and Natural Resources Division, the UNDP Regional Office for Asia and the Pacific, the Asian Disaster Preparedness Centre, ICIMOD, the International Crop Research Institute for the Semi-Arid Tropics and the International Rice Research Institute.

263. The ENRIN programme for the Commonwealth of Independent States and Central and Eastern European countries with economies in transition continues. Four GRID centres are operational in the region. Several proposals to continue capacity-building and networking for better environmental information at the national and subnational levels are awaiting funding.

264. Based on the recommendations of the World Conference on Science, held in Budapest in 1999, and UNISPACE III, the UNESCO Division of Earth Sciences has developed a space education project to be launched in early 2002. The project aims to promote the peaceful use and exploration of outer space and to raise the awareness of young people of the multidisciplinary applications of space science and technology for the well-being of society through capacity-building and outreach activities. To mark the launching of the project, UNESCO will hold a worldwide essay contest for students at the secondary level and will organize, in cooperation with ESA, space events during World Space Week.

265. With a view to strengthening indigenous capacity in the management and technical application of space programmes, UNESCO will assist a number of African students to participate in the annual multidisciplinary postgraduate courses of the International Space University on space technology.

266. WMO plans to continue to collaborate with the United Nations, other organizations and WMO members in sponsoring training events during the biennium 2001-2002. The postgraduate course in hydrology held annually in Kenya involves training in the use of satellite-based images and GIS in hydrology and water resource assessment. In the projects funded by the World Bank in the Mediterranean basin, called MED-HYCOS, additional staff from participating countries were trained in the operation and management of DCPs using Meteosat to collect hydrological, water-quality and related meteorological data and in the application of MED-HYCOS tools to national hydrometeorological data. Within the framework of the SADC-HYCOS project funded by the

European Commission in the SADC area for the development of a regional hydrological information system, staff from the national hydrological services of SADC countries have been trained in the installation, operation and maintenance of DCPs for collecting hydrological, water-quality and related meteorological data, in national and regional database management and Internet-served technologies. Within the framework of the AOC-HYCOS pilot project, training was conducted for the staff of the regional centre in the management of hydrological data transmitted via the Advanced Research and Global Observation Satellite (ARGOS) and Meteosat systems. Among the outputs of the work of the experts of the working groups of the WMO Commission for Hydrology, guidance material on the applications of remote sensing to hydrology has been published, notably a report entitled "Current operational applications of remote sensing in hydrology" (OHR No. 43/WMO No. 884). Comprehensive material on the same subject has also been prepared for inclusion in the next edition of the *WMO Guide to Hydrological Practices* (WMO No. 168).

267. WMO grants fellowships under its Voluntary Cooperation Programme and its regular budget, as well as through UNDP and trust funds, for studies or training in meteorology, climatology and operational hydrology, including studies and training in satellite meteorology, interpretation of meteorological satellite photographs, satellite transmission systems and nephanalysis. In addition to the training of fellows at WMO regional meteorological centres, WMO members also provide training in numerical weather prediction products and interpretation of meteorological satellite data through fellowships offered by them under the Voluntary Cooperation Programme.

F. Advancing scientific knowledge of space and protecting the space environment

268. Within the framework of the United Nations Programme on Space Applications, the Office for Outer Space Affairs will organize the Eleventh United Nations/European Space Agency Workshop on Basic Space Science in Cordoba, Argentina, from 9 to 13 September 2002. A similar workshop is also planned in 2003 for the benefit of the region of Asia and the Pacific.

269. The United Nations Programme on Space Applications, in cooperation with ESA, will continue to provide technical assistance for the establishment and operation of astronomical telescope facilities in Egypt, Honduras, Jordan, Paraguay, the Philippines, Sri Lanka and Uruguay. The establishment and operation of telescope facilities are follow-up projects to the series of United Nations/ESA workshops on basic space science.

G. Other activities

270. ESCAP plans to hold the following regional meetings as follow-up to the recommendations of the Second Ministerial Conference on Space Technology Applications for Sustainable Development:

(a) The eighth session of the Intergovernmental Consultative Committee on the Regional Space Applications Programme for Sustainable Development in Beijing in 2002. The venue of the ninth session, in 2003, is to be determined;

(b) The meeting of the Dialogue Forum for Regional Initiatives for Space Cooperation in Asia and the Pacific to exchange information on the work of the member States and on advances made by the regional initiatives, including the Asia-Pacific Multilateral Cooperation on Space Technology and Applications and the Asia-Pacific Regional Space Agency Forum, and to identify substantive projects for implementation under regional arrangements;

(c) Regional seminars and workshops on development of space technology applications for the minimum common programme of RESAP II.

271. ESCAP will hold the annual meeting of the Regional Working Group on Space Sciences and Technology Applications in Tehran in 2002. The venue of the annual meeting in 2003 is to be determined. The Regional Working Group agreed to strengthen regional arrangements to implement RESAP II, in particular by further developing through a phased approach common denominator project proposals relevant to the group, such as the investigation of infrared technologies for detection of fires, a preliminary study on the feasibility of developing educational resources suitable for use

with low-cost ground stations and sharing of space science data from space missions and ground networks.

272. As a part of its regular information service activities, ESCAP will prepare and disseminate publications on studies conducted within the framework of RESAP and will continue to publish the annual *Asian-Pacific Remote Sensing and GIS Journal* and news on RESAP activities at the regional level in Asia and the Pacific in the quarterly *Environment and Natural Resources News*.

273. ESCAP will continue to update its home page on space technology applications on the Internet. The ESCAP regional working groups on remote sensing, geographic information systems and satellite-based positioning, on satellite communication applications, on meteorological satellite applications and natural hazard monitoring and on space sciences and technology applications will continue to develop and update their respective home pages.

274. UNEP continues to place strong emphasis on inter-agency cooperation at all levels in Central and Eastern Europe, in particular with UNHCR, UNITAR, ECE, UNDP, the WHO European Centre for Environment and Health, the World Bank, the Regional Environmental Centre in Budapest, the Organisation for Economic Cooperation and Development, the European Environment Agency, GEF, the Poland, Hungary: Aid for Reconstruction of the Economy (PHARE) Programme of the European Union, the Community Programme of Technical Assistance for CIS Countries (TACIS) and the World Conservation Monitoring Centre.

275. UNESCO will contribute significantly to the World Space Congress, to be held in Houston, Texas, United Sates, from 10 to 19 October 2002, by supporting the participation of specialists from developing countries in the Congress and by being a member of the Programme Committee of the United Nations/International Astronautical Federation (IAF) Workshop on Space Solutions for Global Problems: Building Working Partnerships with All Stakeholders in Human Security and Development, the IAF/Committee on Space Research (COSPAR) Session on Existing Space Programmes and Applications for Natural Disaster Mitigation, the IAF Space and Education Symposium and the COSPAR Symposium on Natural and Manmade Hazard Management Using Space Technology.

276. In collaboration with intergovernmental organizations and non-governmental organizations, including the Molecular and Cell Biology Network, and through its networks in cell biology and biotechnology (e.g. MIRCENs) and its Biotechnology Action Council programme, UNESCO will continue to support research and training activities with living microbial systems and on their interaction with macrobiotic entities in extreme and harsh environments, thus aiding in the eventual emergence of exobiology research and planetary bioengineering of terrestrial and extraterrestrial environments.

277. UNESCO will continue to undertake studies at the regional level on the implications of electronic communication technologies, or the "information superhighways", for the protection and dissemination of intellectual works by electronic means, the three regional committees, for Asia, Europe and Latin America, and assessed the basic infrastructure of the various segments of the information superhighways, mainly the convergence of telecommunications, broadcasting, including satellite broadcasting, and electronic networks. The regional committees will have to define the following for their regions (see A/AC.105/726, paras. 190 (a)-(c)):

(a) An outline of a national policy for the implementation of the basic infrastructure of transmission and digital dissemination of information;

(b) The main principles to follow in adapting national laws in order to ensure the protection of the legitimate rights of authors and of others in the digital multi-media context, as well as to promote regional harmonization to secure cultural exchange;

(c) The strategy to be adopted by the States of the region and measures to be taken in order to promote the creation and development of cultural industries that will produce and disseminate products relating to digital works and performances as well as distance education.

V. Review of matters related to the coordination of activities within the United Nations system

A. Status of inter-agency coordination

278. Following the restructuring of the Administrative Committee on Coordination machinery that took place from 1992 to 1993, the Inter-Agency Meeting on Outer Space Activities is no longer a subcommittee of the Committee. It has, however, continued to report to the Committee on the Peaceful Uses of Outer Space and its Scientific and Technical Subcommittee on the coordination of space-related activities in the United Nations system.

279. The current work of the Inter-Agency Meeting includes the following: (a) in-depth review of the cooperation of the organizations of the United Nations system in remote sensing and related geographic information system activities: implementation of the recommendations of Agenda 21; (b) enhancement of coordination among the organizations of the United Nations system through the use of advanced information technologies; and (c) review of the plan of action of UNISPACE III and implementation of follow-up activities.

280. At its twenty-first session, in 2001, the Inter-Agency Meeting stressed that the heads of organizations of the United Nations system should be made more aware of the work of the Inter-Agency Meeting and that its work should be included in the Administrative Committee on Coordination. It was agreed that organizations participating in the Meeting should collectively formulate a message to the heads of organizations of the United Nations system and to policy makers in order to highlight the usefulness and cost-effectiveness of space applications.

281. At its second regular session of 2001, the High-level Committee on Programmes of the Administrative Committee on Coordination reviewed the subsidiary machinery of the latter. The High-level Committee recalled its agreement that the new approaches governing the organization of inter-agency cooperation emphasized flexibility, continuity of interactions, systematic use of task managers and the increased use of time-bound task forces rather than permanent subsidiary bodies with a fixed periodicity of meeting. The High-level Committee acknowledged the need for continued inter-agency work in all areas covered by existing subsidiary bodies and other inter-agency groups currently operating in the programme area. It agreed that a generalized approach should be adopted whereby those bodies might pursue coordination in their respective areas but not necessarily as standing bodies of the High-level Committee. While the High-level Committee would not exercise direct oversight over the work of those relevant inter-agency bodies and networks, it would retain the possibility of entrusting them with specific tasks as required as well as of keeping track of their activities to ensure a system-wide overview of coordinating mechanisms.

B. Experiences gained, lessons learned and recommendations

282. From its data- and information-related operations in Afghanistan, East Timor, Eritrea, Kosovo, Mozambique and Sierra Leone, the Office for the Coordination of Humanitarian Affairs, in close collaboration with its humanitarian partners, is developing a compendium of lessons learned in the setting up of humanitarian information systems. The study will also include the use of space-related products in support of humanitarian preparedness and response.

283. The Office for the Coordination of Humanitarian Affairs, in the context of its emergency field coordination training, is developing information technology/information management-specific training packages that will include the use of geographic information and remote sensing products for humanitarian preparedness and response. The training package is expected to be shared with the United Nations Staff College in Turin, Italy, and to be mainstreamed into United Nations agency-specific emergency training response.

284. In 2001, UNHCR submitted a draft paper on the use of satellite imagery for humanitarian operations in the context of the inter-agency working group, GIST. Particular recommendations regarding the use and the sharing of satellite information were developed in coordination with other agencies.

285. A meeting was organized by UNHCR in Geneva in January 2001 in the context of a European

Union-funded project on environmental monitoring of refugee camps using high-resolution satellite and recommendations were made by users. Outputs are posted at http://www.enviref.org

286. UNHCR is continuing its project called the Framework for Environmental Monitoring and Assessment of Refugee operations (FRAME), where geographic information and satellite imagery are tested to improve environmental assessment and environmental monitoring in refugee contexts. Preliminary results can be seen on the World Wide Web at http://guinee-hcr.cirad.fr

287. UNHCR hosted a meeting for Geneva-based United Nations entities under the auspices of the United Nations Geographic Information Working Group in September 2001. The meeting facilitated closer contacts between users of GIS and related tools and opened up possibilities for closer inter-agency cooperation in the field.

288. ESCAP recommended that inter-agency meetings deal with specific ad hoc issues and be result-based and target-oriented.

Notes

[1] See *Report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 19-30 July 1999* (United Nations publication, Sales No. E.00.I.3).

[2] Ibid., chap. I, resolution 1.

Annex I

Calendar of significant events in 2002

Date	*Event*	*Venue*
Early 2002	Launching by United Nations Educational, Scientific and Cultural Organization (UNESCO) of its space education project	France
5-8 February	Symposium on Best Practices in Information Exchange	Geneva
25 February-8 March	Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space, thirty-ninth session	Vienna
March	United Nations Geographic Information Working Group	Washington, D.C.
March	Geographic Information Support Team	Geneva
2-12 April	Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space, forty-first session	Vienna
April	Seventh Meeting of the Economic and Social Commission for Asia and the Pacific (ESCAP) Regional Working Group on Space Sciences and Technology Applications	Tehran
2 May-8 June	Twelfth United Nations/Sweden International Training Course on Remote Sensing Education for Educators	Stockholm and Kiruna, Sweden
30 May	Seventh Session of the Sponsors Group for the Global Observing Systems	Paris
31 May	Ninth Meeting of the Integrated Global Observing Strategy (IGOS) Partnership	Paris
May	Seventh Meeting of the ESCAP Regional Working Group on Satellite Communication Applications	Bangkok
June	Global Disaster Information Network Conference	Rome
June	Seventh Meeting of the ESCAP Regional Working Group on Meteorological Satellite Applications and Natural Hazard Monitoring	Beijing
June	Eighth Session of the Intergovernmental Consultative Committee on the Regional Space Applications Programme for Sustainable Development in Asia and the Pacific	Beijing
15-19 July	Fourth United Nations/United States Workshop on the Use of Global Satellite Positioning Systems, for the benefit of Africa	Lusaka
26 August-4 September	IGOS Partnership side event during the World Summit on Sustainable Development	Johannesburg, South Africa
September	Third United Nations/Austria/European Space Agency (ESA) Symposium on Enhancing the Participation of Youth in Space Activities	Graz, Austria

Date	*Event*	*Venue*
4-10 October	UNESCO/ESA World Space Week celebrations	Noordwijk, Netherlands
10-12 October	United Nations/International Astronautical Federation Workshop on Space Solutions for Global Problems: Building Working Partnerships with All Stakeholders in Human Security and Development	Houston, United States of America
5-8 November	UNESCO/EURISY workshop on the use of remote sensing to monitor World Heritage sites	International Space University, Strasbourg, France

Annex II

List of significant outputs[a]

Symbol	*Title or description*	*Date of issuance*
Office for Outer Space Affairs		
A/57/20	Report of the Committee on the Peaceful Uses of Outer Space on its forty-fifth session (5-14 June 2002)	Late 2002
ST/SPACE/7	*Seminars of the Programme on Space Applications*, No. 13	2002
ST/SPACE/8	*Highlights in Space 2001*	2002
International Strategy for Disaster Reduction		
	Inter-Agency Task Force on Disaster Reduction: Summary of Discussion and Conclusions of the Fourth Meeting	November 2001
Economic Commission for Africa		
	The Challenge to Africa of Globalization and the Information Age: Proceedings of the African Development Forum 1999	2000
E/ECA/DISD/ CODI.2/2	Policy and Regulatory Issues in the Development of Africa's Information Infrastructure: the Need to Integrate Geo-information within the National Information and Communication Infrastructures (NICs)	2001
E/ECA/DISD/ CODI.2/6	Experiences and Visions on Spatial Data Infrastructures (SDIs)	2001
Economic and Social Commission for Asia and the Pacific		
	Asian-Pacific Remote Sensing and GIS Journal, vol. 13	December 2000
ST/ESCAP/2162	The minimum common programme framework: Regional Space Applications Programme for Sustainable Development: Phase II	2001
United Nations Educational, Scientific and Cultural Organization		
	Brochure on space-related activities	2002
	IGOS Partnership brochure	2002
	Computer-based learning module on the use of multi-sensor and multi-temporal remote sensing data sets for fisheries	2002

[a] Outputs listed in the report of the Secretary-General (A/AC.105/757) are not repeated in the present report.